CERAMIC ABSTRACTS and THE BULLETIN

OF THE

AMERICAN CERAMIC SOCIETY

JUNE 15, 1943

MONTHLY PUBLICATION DEVOTED TO THE ARTS AND SCIENCES RELATED TO THE SILICATE INDUSTRIES

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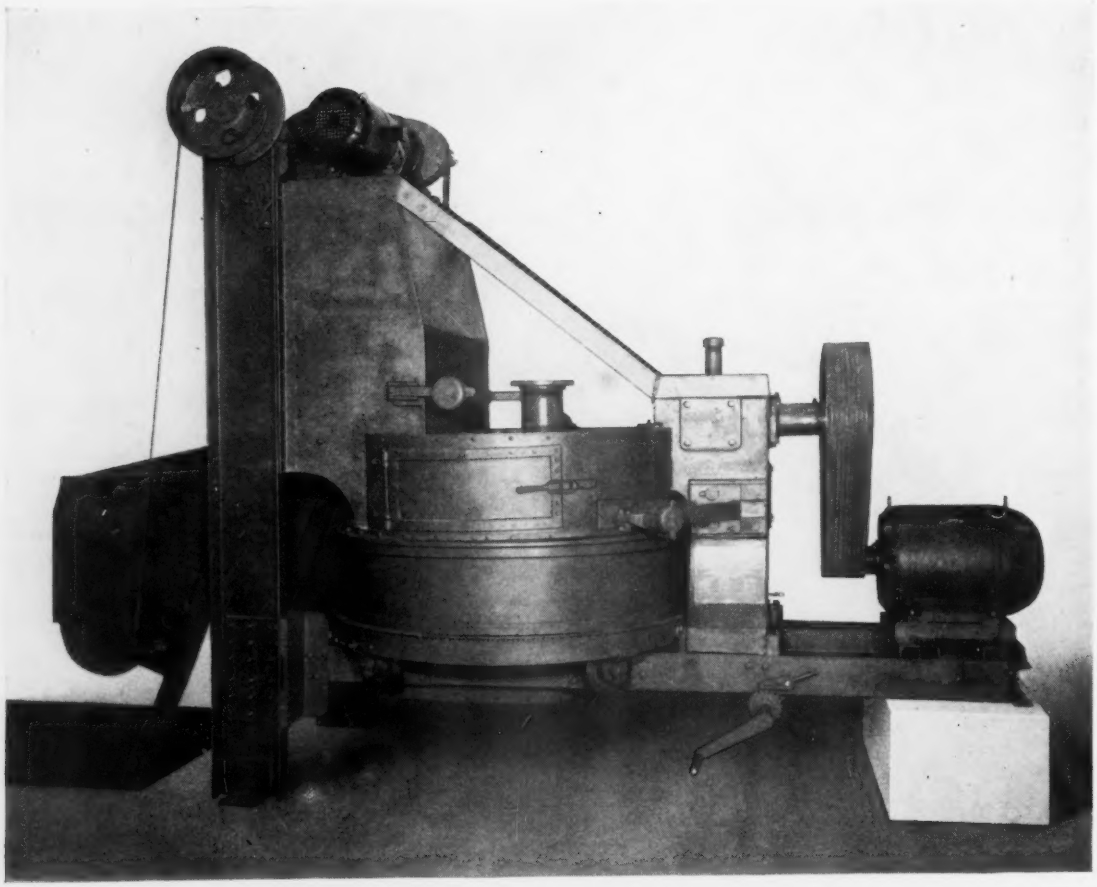

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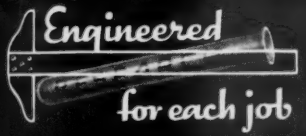

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ARMCO IRON ENAMELED PRODUCTS
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MODERN SHEET STEELS ARE SHAPING YOUR FUTURE
SPECIAL PURPOSE ARMCO SHEET METALS
THE AMERICAN ROLLING MILL COMPANY
This ARMCO advertisement appeared in The Saturday Evening Post, March 27, 1943.
1943→

Keeping people metal-minded in 1943 as in 1917

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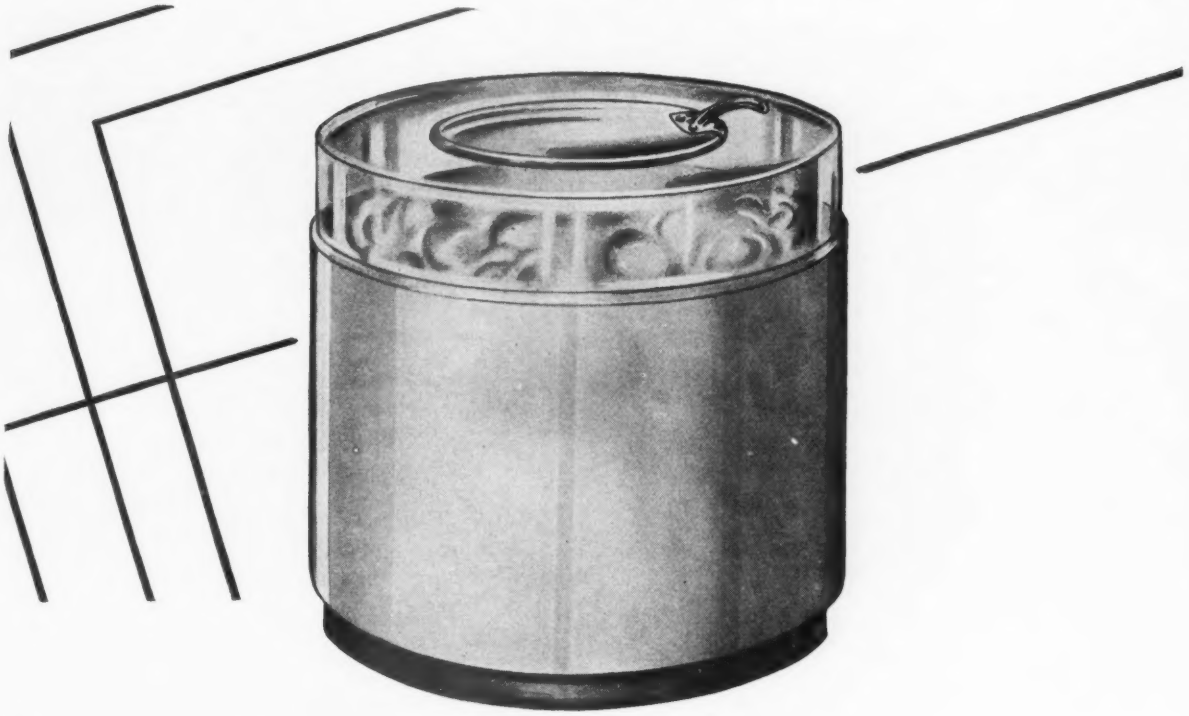

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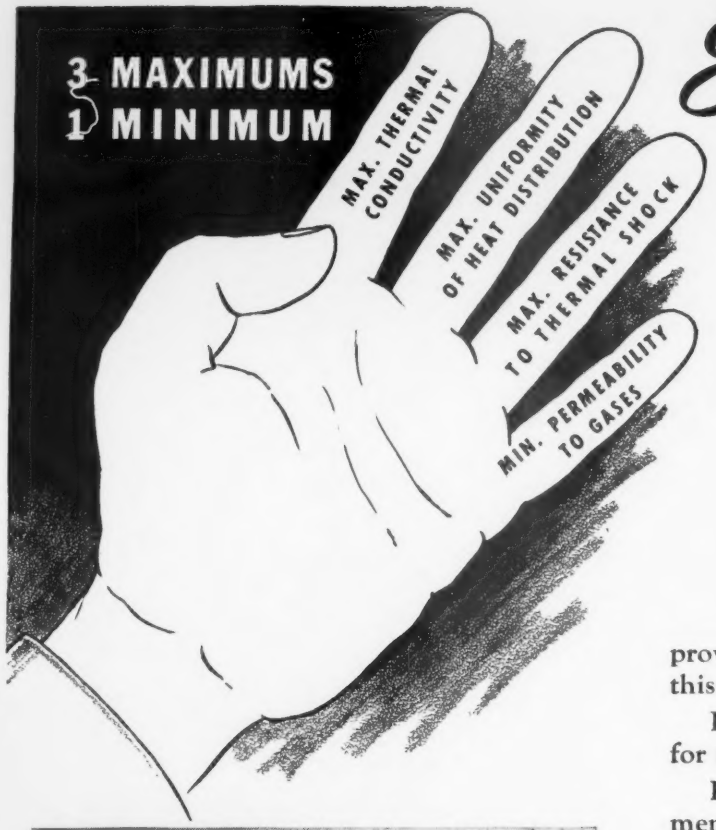

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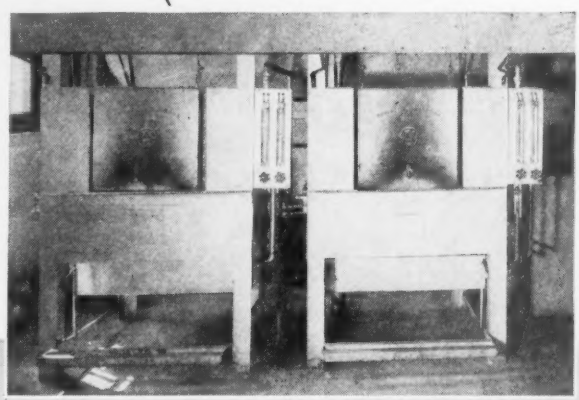
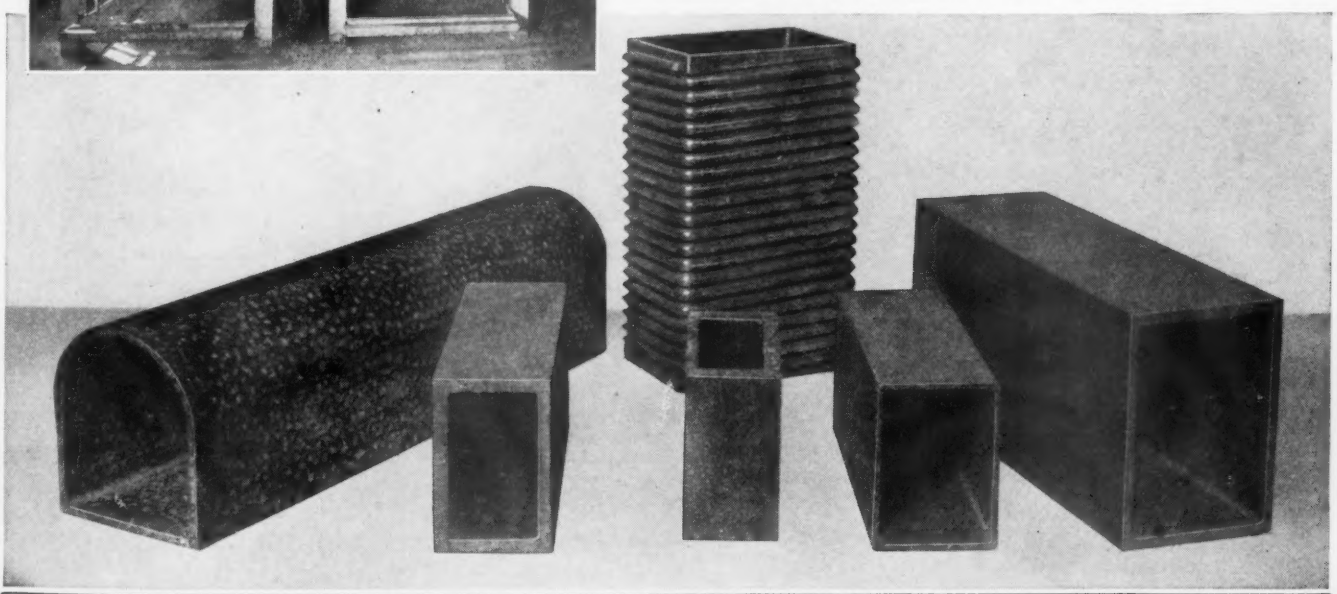
The economy of Electro's muffles for all types of annealing and heat treating furnaces — oil, gas and electric, is created by high thermal conductivity, high resistance to thermal shock (do not crack easily) and uniform heat distribution.



Furnaces constructed by Surface Combustion Corp. equipped with Electro's refractories.



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Re-paved Electrocast Bottom Saves Major Repair!

SOMETIME ago we published the case history of a working-end in which an old and badly worn clay bottom had been re-paved with Corhart* Electrocast, and how the Corhart sidewalls had thereby been saved for at least another campaign.

Above we show a photo of that paved working-end bottom after one fire of approximately 24 1/2 months. Note that the paving is "just as good as new"—and that after a few minor changes in sidewalls, the furnace is ready for another run! Practically no wear on the Corhart paving is apparent, and it is believed that the construction has and should contribute to improved glass quality.

Thus the Corhart Electrocast re-paving has now again saved a major repair—the original Corhart working-end sidewalls have now served for four fires approximating 7 1/2 years—and the operator has saved the time, the materials and the PRODUCTION that would otherwise have been lost by destroying and replacing the old working-end bottom and sidewalls.

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* Not a product, but a registered trade-mark.

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REFRACTORIES

Ceramic Abstracts Section

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M. V. Condoide	Max Hartenheim	G. M. Hutt	J. G. Phillips	B. C. Ruprecht	L. E. Thiess
P. S. Dear	F. G. Heck	G. A. Kirkendale	E. C. Pierce	A. B. Searle	Hans Thurnauer

JOURNAL REFERENCE: The journal name appears in italics, followed by the volume (bold-faced), issue number (in brackets), page numbers, and year (in parentheses).

Vol. 22 **June 15, 1943** **No. 6**

Abrasives

Combination grinding and buffing machine. ANON. *Machinery* [N. Y.], **49** [6] 212 (1943).—A combination grinding and buffing machine with exhaust equipment is manufactured by the Standard Electrical Tool Co., Cincinnati, Ohio. R.H.B.

Grinding methods that aid in aircraft production. ANON. *Machinery* [N. Y.], **49** [6] 174–77 (1943).—Illustrated. R.H.B.

Hilco Universal cutter-grinder with special index dividing head. ANON. *Machinery* [N. Y.], **49** [5] 181 (1943).—A high degree of flexibility, quick setups, accommodation of a wide range of cutters, compactness, absence of vibration, and sturdy construction are features of the new Hilco Universal cutter-grinder brought out by the Berco Mfg. Co., Chicago, Ill. R.H.B.

Lima tool-room pedestal grinder. ANON. *Machinery* [N. Y.], **49** [6] 210 (1943).—The Lima pedestal grinder accommodates wheels 12 in. in diameter. R.H.B.

Moore precision jig grinder. ANON. *Machinery* [N.Y.], **49** [6] 206 (1943).—This machine was developed for grinding holes to size and for correcting the location of holes in hardened parts. See "Jig . . . ," *Ceram. Abs.*, **22** [2] 27 (1943). R.H.B.

Nonaqueous degreasing solvent for use in finishing processes. ANON. *Machinery* [N. Y.], **49** [6] 199 (1943).—Cyclodiene Hydrocarbon, a nonaqueous degreasing solvent, is being manufactured by the Colonial Alloys Co., Philadelphia, Pa., for use in connection with plating, painting, Parkerizing, anodizing, or other finishing processes. R.H.B.

Machinery of magnesium. A. M. LENNIE. *Amer. Machinist*, **87** [7] 82–84 (1943).—Because of its relative softness, Mg requires medium-hard grinding wheels with medium to coarse abrasive grits having a grain size of 20 to 70, an open structure of 4 to 8, and a vitrified or resinoid bond. Mg should ordinarily be ground dry, but in special cases such as surface grinding, where a fine finish is desired, wet grinding can be employed using a low-viscosity mineral oil as a cutting fluid. The grinding and polishing of Mg produces a highly inflammable dust which, in proper proportions with air, ignites with violent explosions. The dust must therefore be removed from the working area and precipitated by a heavy spray of water or low-viscosity oil to form a sludge. Preventive measures and safety installations are described. The following recommendations are given for polishing magnesium.

Operation	Abrasive	Wheel: Type	Wheel: Diameter (in.)	Wheel: Surface speed (ft./min.)	Remarks
Rough polish	60–100 grit	Canvas, sheepskin, or felt	6–12	5000–6000	Required only for rough surfaces, e.g., sand castings. Grease stick may be used.
Medium polish	100–200 grit	Built-up cloth	6–12	5000–6000	Grease stick may be used.
Dry fine polish	Dry or Lea cpd., grade L or C	Loosely sewed buff	6–12	5000–6000	
Buffing	Tripoli	Loosely sewed buff; 74–82 count cloth	10–14	6000–8000	
Coloring	Dry lime	Canton flannel buffs	12–16	8000–12,000	Minimum pressure to produce best luster.

M.HA.

Process for producing waterproof abrasive paper. S. V. YAKUBOVICH AND E. I. L'VOVA. *Zhur. Priklad. Khim.*, **14**, 640–45 (1941); abstracted in *Chem. Zentr.*, **1942, I**, [16] 2052.—The most suitable material for waterproof abrasive paper is Russian "cable paper" saturated with natural linseed-oil varnish (not castor-oil varnish or artificial varnish), on which the abrasive (silicon carbide proved better than corundum) is fixed by a bond with an alkyd base, such as phenol alkyd or cresol alkyd, and coated with an additional layer of varnish (the best are "Albert oil," glycerine phthalic acid, and glycerine phthalic acid cresol varnish). Oil and asphalt varnishes proved to be unsuitable. For coarse abrasive paper, varnishes with greater viscosity are used; the resistivity and wearing qualities of fine abrasive paper can be increased $1^1/_2$ to 2 times by a second coating. The abrasive must be uni-

formly distributed on the surface of the paper in such a way that the individual grains (whose length should be 2 to 3 times the width) lie with the cutting surface up. M.V.C.

Recovering diamond dust. GUSTAV OVERBECK. *Draht-Welt*, **35**, 19–20 (1942); abstracted in *Chem. Zentr.*, **1942, I** [16] 2052.—As much as 85% diamond dust can be recovered if all implements, etc., which come in contact with the diamond dust are dipped in ethyl trichloride. The latter can be evaporated, and the impurities can be removed with sulfuric acid. M.V.C.

Unusual grinding operations in making war equipment. ANON. *Machinery* [N. Y.], **49** [5] 154 (1943).—Landis Tool Co. machines for crankshaft grinding, gun-part sizing, and cam grinding are shown. R.H.B.

Walls abrasive band grinder. ANON. *Machinery* [N.Y.], **49** [6] 216 (1943).—The Walls Sales Corp. (New York) features a small band grinder for tool shops. R.H.B.

BOOK

Grinding Wheels and Their Uses. JOHNSON HEYWOOD. Published under the auspices of the Grinding Wheel Manufacturers Assn. Penton Publishing Co., Cleveland, 1942. 2d ed. 436 pp., 436 figs. Price $3.—This book is intended to serve as a handbook on modern grinding practice for shop executives and as a textbook for grinding-machine operators, trade schools, and technical colleges. Chapters cover (1) abrasive materials, (2) manufacture of grinding wheels, (3) theory of grinding, (4) surface qualities and finishes, (5) wheel specifications for particular jobs, (6) wheel shapes and sizes, (7) truing, dressing, and balancing, (8) use of grinding fluids, (9) tool and cutter sharpening, (10) sharpening of cemented carbide tools, (11) cylindrical grinding, (12) grinding cams, etc., (13) roll, internal, surface, disk, centerless, thread, gear, and die and mold grinding, (14) lapping, (15) honing, (16) superfinishing, (17) preparation of metallographic specimens, (18) cutting off with abrasive wheels, (19) use of abrasives in nonmetalworking industries, (20) grinding castings, welds, and billets, and (21) cost reduction and increasing production. Appendices include (*A*) table of wheel recommendations, (*B*) lapping-compound recommendations, (*C*) wheel breakage and safety tips, (*D*) standard grinding-wheel markings, and (*E*) glossary of trade names. This book is a clearing house of information to which many hundreds of men and shops have contributed not only their practical and theoretical knowledge but also descriptions of the various grinding practices and methods which they have found best.

PATENTS

Abrasive. R. C. BENNER AND H. N. BAUMANN, JR. (Carborundum Co.). U. S. 2,318,360, May 4, 1943 (May 5, 1941).—An abrasive or wear-resistant material consisting essentially of alumina having intergranularly dispersed therein a minor amount of monazite.

Abrasive coating apparatus. R. P. CARLTON AND T. J. MILLER (Minnesota Mining & Mfg. Co.). Can. 411,299, March 23, 1943 (Aug. 24, 1938). G.M.H.

Abrasive cutoff machine. S. C. DREHER. U. S. 2,315,090, March 30, 1943 (Jan. 29, 1941).

Abrasive grain. A. A. KLEIN (Norton Co.). Can. 411,302, March 23, 1943 (June 9, 1942; in U. S. July 2, 1941). G.M.H.

Abrasive-sheet coating method. R. P. CARLTON AND T. J. MILLER (Minnesota Mining & Mfg. Co.). Can. 411,014, March 9, 1943 (Aug. 24, 1938). G.M.H.

Apparatus for resurfacing. J. Y. BLAZEK, G. E. SEARS, AND V. R. ROY (Lempco Products, Inc.). U. S. 2,315,891, April 6, 1943 (Jan. 15, 1941).

Car wheel grinding machine. C. G. FLYGARE AND H. A. SILVEN (Norton Co.). U. S. 2,316,058, April 6, 1943 (March 18, 1942).

Coated abrasive. H. R. STRATFORD (Stratmore Co.). U. S. 2,317,650, April 27, 1943 (May 22, 1939).

External honing tool. W. H. HARRIS, JR. (Micromatic Hone Corp.). U. S. 2,316,422, April 13, 1943 (April 7, 1941).

Gear-grinding apparatus. H. W. SEMAR (Westinghouse Electric & Mfg. Co.). U. S. 2,316,490, April 13, 1943 (March 25, 1942).

Gear-grinding and like machines. DENNIS BROS., LTD., AND E. A. LIMMING. Brit. 551,417, March 3, 1943 (Oct. 28, 1941).

Grinder attachment. WILLIAM VAN TRIEST. U. S. 2,316,904, April 20, 1943 (Nov. 22, 1940).

Grinding or abrading machines. A. DORIN. Brit. 551,660, March 17, 1943 (Aug. 1, 1941).

Grinding machine. EUGENIO PASCUCCI. U. S. 2,316,886, April 20, 1943 (Sept. 29, 1941).

Grinding and polishing machine. L. L. HERCIK (Hill Acme Co.). U. S. 2,316,582, April 13, 1943 (May 31, 1940).

Grinding taps for use in cutting screw threads. AUTO MACHINERY CO., LTD., AND B. LEEDHAM. Brit. 551,850, March 24, 1943 (May 29, 1942).

Grinding tool. K. I. HARVEY. U. S. 2,316,161, April 13, 1943 (May 23, 1939).—An abrasive article consisting of abrasive particles bonded with a ceramic derived from a boron salt, a lead salt, and a lithium salt.

Grinding wheel. S. S. KISTLER (Norton Co.). Can. 411,303 to 411,307, March 23, 1943 (July 20, 1942; in U. S. Aug. 2, 1941). G.M.H.

Grinding-wheel dressers. S. F. WARREN (Dumore Co.). Brit. 551,395, March 3, 1943 (April 17, 1942).

Honing machine. D. T. PEDEN (Micromatic Hone Corp.). U. S. 2,317,079, April 20, 1943 (April 7, 1941).

Honing or polishing tool. ARNOLD KRASTIN. U. S. 2,316,257, April 13, 1943 (Feb. 3, 1941).

Lapping machine. H. S. INDGE (Norton Co.). U. S. 2,315,859, April 6, 1943 (Jan. 24, 1941). G. F. JOHNSON (Bower Roller Bearing Co.). U. S. 2,316,071, April 6, 1943 (May 23, 1941).

Lathe tool grinding fixture. W. R. LANDY. U. S. 2,317,996, May 4, 1943 (Aug. 27, 1941).

Manufacture of abrasives. R. P. CARLTON (Minnesota Mining & Mfg. Co.). U. S. 2,318,570, May 4, 1943 (Jan. 20, 1930). U. S. 2,318,571, May 4, 1943 (Dec. 22, 1933).

Means for automatically adjusting adjustable abrasive or cutting tools. E. D. BALL (George H. Alexander Machinery, Ltd.). U. S. 2,317,714, April 27, 1943 (March 13, 1942).

Method of and apparatus for honing. A. M. JOHNSON (Barnes Drill Co.). U. S. 2,315,794, April 6, 1943 (May 8, 1939).

Method of grinding butt joints of wound cores. J. H. BRAMBLE AND MICHAEL DUNN (Westinghouse Electric & Mfg. Co.). U. S. 2,318,052, May 4, 1943 (April 15, 1941).

Method and means for controlling honing operation by expansion. J. E. KLINE (Micromatic Hone Corp.). U. S. 2,315,062, March 30, 1943 (Feb. 18, 1939).

Methods of profile grinding and profile grinding machines. E. R. EDWARDS AND P. GRODZINSKI. Brit. 551,332, March 3, 1943 (Aug. 18, 1941).

Molded article, binder, and process of manufacturing. F. J. JOHNSON. U. S. 2,315,713, April 6, 1943 (June 18, 1940).—A binder for molded articles consisting essentially of water glass mixed with zinc stearate and brought to a creamy consistency.

Polishing or buffing wheel and disks therefor. THOMAS WHITEHEAD. U. S. 2,317,703, April 27, 1943 (July 24, 1942).

Safety shield for bench grinders. CEDRIC POWERS (Stanley Works). U. S. 2,315,132, March 30, 1943 (April 3, 1941).

Screw thread grinding machine. I. J. SNADER (Ex-Cell-O Corp.). U. S. 2,316,816, April 20, 1943 (Oct. 30, 1940).

Valve stem grinding attachment. L. L. JOHNSON. U. S. 2,316,591, April 13, 1943 (Feb. 3, 1941).

Art and Archeology

British crafts. ANON. *Design*, **44** [4] 6–7 (1942).—Some of the outstanding artist potters are Bernard Leach, Michael Cardew, and W. Staite Murray. Their work includes low-temperature earthenware, mainly with slipware decoration, and the higher-temperature salt-glaze ware and stoneware. Many examples show salt glazes derived from wood ashes in the Chinese manner. Illustrated. L.S.

Casting pottery from molds. ANGUS DOUPLE. *Design*, **44** [4] 18 (1942).—Casting is much used in commercial production where many duplicates of the same piece are to be made. There are three essential processes: the making of the model, the making of the mold, and the casting. Illustrated. L.S.

Clay—what can you do with it? ANGUS DOUPLE. *Design*, **44** [1] 24–26 (1942).—Clay is found in almost every community but not always in a condition suitable for pottery making. Preparing clay for use, however, provides part of the satisfaction found in making pottery. **Firing process.** *Ibid.*, [2] 14–15.—The firing is the most important part of pottery making. Several fundamental principles must be understood: (1) the green ware must be thoroughly dried before being placed in the kiln; (2) heat must be applied slowly; (3) the temperature must reach a point at which the fusion of the clay particles takes place; and (4) the pottery must cool slowly. Kilns are of two types: (*a*) that in which the ware is exposed to the flames and fumes of combustion and (*b*) that in which the ware is protected from the effects of combustion by another chamber within the kiln. The fuel may be electricity, gas, coal, or oil. **Make gifts of it.** *Ibid.*, [3] 16.—Clay gifts can be beautiful and useful and will give the craftsman a real satisfaction. Illustrated. L.S.

Development of the tile industry in the United States. EVERETT TOWNSEND. *Bull. Amer. Ceram. Soc.*, **22** [5] 125–52 (1943).—6 photos.

Further excavations (1939) at the Mumbwa caves, Northern Rhodesia. J. DESMOND CLARK. *Trans. Roy. Soc. S. Africa*, **30** [4] 133–302 (1942).—Pottery fragments associated with the Iron Age cultures and quartz implements from the Northern Rhodesian Wilton are described. Illustrated. L.W.V.

Indian arts of North and South America. FRANCES MONG. *Design*, **43** [9] 4–7 (1942).—The high degree of art ability and the artistic skill attained by the Nazca Indians are shown in photographs of two ceramic bowls. L.S.

Mound Builders. ANON. *Design*, **43** [9] 8–10 (1942).—The Mound Builders of North America showed remarkable ability in sculpture and ceramic art. Plastic claywork resembled the carved, harder materials. The same subject matter was used for stone, clay, and terra cotta. The ornamentation consisted of both the more realistic representation of animals, birds, and humans and a highly conventionalized rendering of inanimate nature such as the sun, clouds, lightning, and other natural phenomena. The Mound Builders never quite reached the excellence of some of the Pueblo peoples or Central American potters. Illustrated. L.S.

Old art revived. MARION GRUBB. *Design*, **43** [7] 6 (1942).—Pennsylvania was one of the early pottery-making states, and the lost art of making true "Dutch" pottery is being revived. Illustrated. See *Bull. Amer. Ceram. Soc.*, **22** [1] 1–5 (1943). L.S.

Personalities in glassware. SYBIL P. ODELL. *Design*, **44** [2] 20 (1942).—In the early Colonial days there was not the immediate need for glass, for the Pilgrims used their pewter, wood, or leather mugs and jugs. A group of eight Dutch and Polish glass blowers arrived in America in 1608. A glass factory was started at Jamestown in 1609. During the 18th century, glassmaking began to become more prosperous, and the Wistarberg glass factory was the first successful industry in America. In the middle of the 18th century, Heinrich Wilhelm Stiegel started on his career as a glassmaker. Pittsburgh had the first glass factory to use coal and still retains its important position in the glassmaking industry. The Boston and Sandwich firm used machines in the making of pressed glass. The modern glass industry is based on this technique of the pressing process. Illustrated. L.S.

Pottery industry of Khurja, Bulandshahar. H. L. CHHIBBER AND H. N. ROY. *Trans. Indian Ceram. Soc.*, **1** [3] 209–15 (1942).—The history of the old and the new pottery industries of the district is described. Methods of manufacture, types of glazes applied to the ware, and kilns used are described. Suggestions for further improvement of the industry are advanced. P.S.D.

Tarascan ceramics in old Mexico. C. COMPTON. *Design*, **44** [7] 4–6 (1943).—Deep in the heart of Mexico lies the ancient and present home of the Tarascan Indians, called in their own language the "Purepeche." The Purepeche, being somewhat isolated geographically and possessing territories suitable only for agricultural pursuits, retained to some degree the original arts and crafts after the Conquest. Certain design forms are used by the descendants of these people in the decoration of pottery, chests, interiors, etc. The major art forms of the Purepeche have been lost to the modern Tarascan, and examples of them are seen only in the provincial museums, the best of which are located in Morelia and in Patzcuaro, or in private collections such as those of Rivera, O'Gorman, and Covarrubias. It is assumed that many of the sculptured and ceramic figures were religious in implication. Many of the smaller pieces were obviously intended to be worn as necklaces. All of these ceramic pieces were made from a local red clay and fired; the smaller figures and the more sculptural pieces are unglazed, while the larger pieces are usually glazed and were evidently used as receptacles for liquids in the home or in religious ceremonies. In quantity, these works in stone and clay compare favorably with the best works of the Toltec-Aztecs and the Mayas. The decorative design of the Purepeche was rather severe, consisting in the main of completely abstract forms combined in abstract patterns very much like those of the Aztecs. The shapes of contemporary Tarascan ceramic ware are also interesting, although the number and variety of shapes are somewhat limited. Illustrated. L.S.

You can make stained-glass windows. ANGUS DOUPLE. *Design*, **44** [3] 17 (1942).—Stained glass is regarded as a forgotten craft and is usually associated with the Gothic cathedrals and medieval architecture of Europe. It has generally been thought that the making of stained-glass windows is expensive and difficult. This craft can be practiced without difficulties. D. outlines the processes: designing, selection of color and shapes, leading, decoration, cutting, putting together, soldering, and cementing. L.S.

SEPARATE PUBLICATION

Archaeological Studies in the La Plata District. EARL H. MORRIS. *Carnegie Inst. Washington Pub.*, No. 519 (Dec., 1939). **Technology of La Plata Pottery.** ANNA O. SHEPARD. *Ibid.*, pp. 249–87.—The history of ceramic technique in the La Plata district is marked by early specialization and subsequent conservatism and comparative continuity of practice. There were, nevertheless, changes from time to time in the pastes and pigments used and gradual trends in workmanship. The course of development can be outlined tentatively and sketchily on the basis of the results of preliminary analysis. Basket Maker III potters had already advanced to the stage of using specially prepared temper, ground igneous rock, not only for painted ware but for plain and culinary ware as well. Although practical considerations may not have dictated the use of this temper, it would seem to indicate that the potters were close observers and capable of learning empirically, because crushed rock, being angular and rough-surfaced, made a much stronger paste than did smooth, rounded grains of sand. Pigments likewise show that the basic techniques which characterized later pottery types were being mastered. Perhaps the most surprising

of all is the occurrence of a lead glaze. One might suppose that this glaze was made accidentally as were the vitrified black paints of Pueblo I, II, and III black-on-white ware, but its characteristics, transparency and low iron content, tell a different story. Basket Maker III potters were intentionally experimenting with new and different materials. Seventeen and one half per cent of the bowls in the La Plata collection show some glaze paint, although on none is the glaze as thick and uniform as on specimens from near Durango. Pueblo I, as compared with Basket Maker III, was a period of conservatism. It appears that the potters narrowed the methods of their predecessors, eliminating materials or procedures which gave least satisfactory results and concentrating their efforts on the refinement of those selected, rather than attempting to evolve anything new. The outstanding innovation of Pueblo II was in tempering. The custom of using sherd temper for black-on-white-ware paste was for the first time established. In Early Pueblo III times pastes continued to be either rock- or sherd-tempered, but pigments were no longer limited to the iron ore, the only kind used during Pueblo I and II times. The fine-quality buff-firing clays of the Upper Cretaceous beds of the La Plata district undoubtedly influenced the course of ceramic development. They made possible the production of a fine whitish ware which could be well fired without danger of bloating and which was free from calcite and the consequent defect of unsightly spalling.

PATENTS

Ceramic coating composition. A. J. DEYRUP (E. I. du Pont de Nemours & Co.). U. S. 2,316,742, April 13, 1943 (June 5, 1941).—A low-melting glaze composition, suitable for use as an overglaze, which comprises lead oxide present in amounts ranging from 40 to 50%; silica, 15 to 36%; boric oxide, 7 to 28%; and alumina, 5 to 15%; all percentages being by weight based on the total weight of the glaze composition.

Ceramic decorating composition. CAMPBELL ROBERTSON AND A. J. DEYRUP (E. I. du Pont de Nemours & Co.). U. S. 2,316,745, April 13, 1943 (June 12, 1941).—A ceramic paint composition comprising a vitrifiable enamel composition suspended in a vehicle containing methyl cellulose.

Decalcomania paper. JOHN MACLAURIN (McLaurin-Jones Co.). U. S. 2,316,120, April 6, 1943 (Aug. 11, 1939).

Deep etching lithographic plate. PHILIP ZEIGER. U. S. 2,316,645, April 13, 1943 (Feb. 25, 1942).—The method of deep etching a plate which consists in coating it with light-sensitive dichromated gum, photographically exposing a design on the coating, developing and removing the unexposed coating portions, treating with etching solution the uncovered portions of the plate, removing the exposed coating portion by washing, covering sections of the plate with water-soluble stop-out medium, applying a film of lacquer to the entire surface of the plate including the stop-out medium, coating the lacquer film with ink, and washing off the stop-out medium together with the lacquer and adhering ink from the unetched portions of the plate while leaving ink in the etched portions of the plate.

Design for glass coffeemaker. FERDINAND S. BARBIERS. Can. 13,433, March 3, 1943. G.M.H.

Cements

Concrete with hydraulic additions. A. STEOPOE. *Materialele de Constructie*, **1**, 152–60 (1941); abstracted in *Chem. Zentr.*, **1942, I** [21] 2694.—Experiments with additions of trass or kieselguhr to Portland and Ferrari cements were made. The advantages and applications of hydraulic additions to concrete are discussed. M.V.C.

Effects of added materials on some properties of hydrating Portland cement clinkers. EDWIN S. NEWMAN, RAYMOND L. BLAINE, CHARLES H. JUMPER, AND GEORGE L. KALOUSEK. *Jour. Research Nat. Bur. Standards*, **30** [4] 281–301 (1943); RP 1533. Price 10¢.—Studies were made of the effects of added materials on the properties of a group of Portland cement clinkers representing standard-Portland, moderate-heat-of-hydration, high-early strength, sulfate-resistant, and white cements. The materials used were gypsum, sugar, calcium chloride, TDA (grinding aid), tannic acid, triethanolamine, calcium acetate, and fluosilicic acid. The effects were judged by comparing the results of tests of specimens of clinker pastes containing the materials under investigation with the results of similar tests of the clinker pastes to which nothing had been added. Although some of the materials caused great changes in the behavior of the clinker pastes during their early history, these effects largely disappeared thereafter. R.A.H.

Hydraulic slag anhydrite cement. P. P. BUDNIKOV. *Novosti Tekhniki*, **10** [2] 33–35 (1941); abstracted in *Chem. Zentr.*, **1942, I** [21] 2693–94.—As only about 25% of the blast-furnace slag is put to profitable use in Russian foundries, a long series of experiments were made to discover its further application. Good results were obtained by grinding dried basic Martin, Bessemer, and foundry slags with 5 to 10% anhydrite (gypsum fired to 500° to 700° or natural anhydrite) as well as 3 to 5% dolomite. After storage in water for 28 days, a resistance to pressure of 180 to 335 kgm. per cm.^{2} depending on the mixing proportion (1:3 with standard sand) was obtained. Suggestions for the manufacturing process and uses of these clinker-free blast-furnace anhydrite slag cements are given. M.V.C.

Moduli of Portland cement. O. KALLAUNER. *Stavivo*, **22**, 349–51, 360–64 (1941); abstracted in *Chem. Zentr.*, **1942, I** [21] 2693.—K. reviews the works of different authors on the ordinary moduli of Portland cement (hydraulic modulus, M_H; silicate modulus, M_S; and the clay modulus, M_A) and their significance and use. Extensive tables showing the results of the experiments of 43 authors are given. M.V.C.

Nature of the prismatic dark interstitial material in Portland cement clinker. WILLIAM C. TAYLOR. *Jour. Research Nat. Bur. Standards*, **30** [4] 329–46 (1943); RP 1536. Price 15¢.—As a result of a series of previous investigations by the phase-equilibrium method, it has been concluded that K_2SO_4 and $K_2O \cdot 23CaO \cdot 12SiO_2$ are the only compounds containing K_2O that may exist when a mixture of K_2O, CaO, MgO, Al_2O_3, Fe_2O_3, SiO_2, and SO_3, in the proportions occurring in Portland cement clinker, is heated and cooled under equilibrium conditions. Frequent observations of a prismatic dark interstitial phase in etched, polished sections of commercial clinker and in rapidly cooled laboratory clinkers led to the present study. The prismatic phase has not been found to exist under equilibrium conditions but has been produced only under conditions of rapid cooling. Both thermal and compositional conditions that have been found to be required for its formation suggest that it may be a metastable form of $3CaO \cdot Al_2O_3$ and monotropic with respect to the stable, isotropic, rectangular $3CaO \cdot Al_2O_3$. The conditions necessary for the formation of this phase have been outlined. Although the exact composition has not been outlined, the close relation between the prismatic phase and $3CaO \cdot Al_2O_3$ leads to the recommendation that this phase be referred to as "prismatic $3CaO \cdot Al_2O_3$" instead of "prismatic dark interstitial material." See "Further. . .," *Ceram. Abs.*, **22** [2] 41 (1943). R.A.H.

Quick method for determining the activity of aluminate, silicate, and alumina cements of blast-furnace melts. K. A. SMIRNOV AND V. I. SEIGERMEISTER. *Zavodskaya Lab.*, **9**, 1232–33 (1940); abstracted in *Chem. Zentr.*, **1942, I** [21] 2694.—A method is described in which the activity of smelting cements is determined in about 20 min. by the titrimetric determination of the alumina content after special pretreatment of the materials. By this method

the probable mechanical strength of the manufactured product can be calculated. M.V.C.

Volume of sediment of watery cement suspensions. HUGO VIERHELLER. *Zement*, **31**, 47–48 (1942); abstracted in *Chem. Zentr.*, **1942, I** [21] 2693.—Differences in volume of sediment were explained by orienting tests as follows: (1) differences in the quantity of constituents of a particle size of less than 0.01-mm. diameter; (2) differences in the property of wetting of the particles of cement on the surface, which property can extend in this case from hydrophile to hydrophobe with all intermediate stages; (3) differences in the cross sections of the space arrangement in the cement sediments after settling; and (4) differences in the types and quantities of electrolytes acting on these cement suspensions which diffuse by passing out of the different bottom layers into the watery suspension. Chiefly K, Na, Ca, Mg, and Al salts are concerned, whose flaking action on suspensions varies greatly in type and quantity and may fluctuate between extremes. M.V.C.

SEPARATE PUBLICATION

Gypsum and Gypsum Products, Fourth Quarter and Annual Summary, 1942. ANON. *U. S. Bur. Mines Periodical Repts.*, QGR 52. 4 pp. Free.—Data are presented on the production of crude and calcined gypsum and on the sales of calcined gypsum and gypsum products. R.A.H.

Enamel

Relation of hydrogen to adherence of sheet-steel enamels. W. A. DERINGER. *Jour. Amer. Ceram. Soc.*, **26** [5] 151–59 (1943).—18 references, 11 figures.

Relation of thickness to impact resistance of porcelain enamel. ROGER L. FELLOWS. *Jour. Amer. Ceram. Soc.*, **26** [5] 160–62 (1943).—3 references, 3 figures.

White opacifiers. P. EYER. *Emailletech. Monats-Blätter*, **17** [36] 44–45 (1941); abstracted in *Chem. Zentr.*, **1942, I** [16] 2052.—Information on metallic and nonmetallic opacifiers to be added in place of tin oxide is summarized. Gas opacification is also referred to. See "Patents. . .," *Ceram. Abs.*, **20** [9] 213 (1941). M.V.C.

PATENTS

Cleaning steel surfaces. C. J. WERNLUND (E. I. du Pont de Nemours & Co.). U. S. 2,315,568, April 6, 1943 (Sept. 28, 1939).—A process for cleaning the surface of a ferrous metal article which comprises making the article the anode in an electrolyte consisting essentially of a solution containing sulfocyanide ions in concentration equivalent to at least about 2 oz. per gal. of alkali metal sulfocyanide and thereafter contacting the article with an acid solution which is capable of dissolving iron oxides.

Enamel compositions. BRITISH THOMSON-HOUSTON CO., LTD. Brit. 551,606, March 17, 1943 (May 20, 1941).

Enameled cooking utensil. R. S. COBB AND W. B. MOORE (Moore Enameling & Mfg. Co.). U. S. 2,315,475, March 30, 1943 (April 23, 1941).

Polishing metals. C. L. FAUST (Battelle Memorial Inst.). U. S. 2,315,695, April 6, 1943 (Nov. 23, 1938).—The method of electropolishing a metal or alloy selected from the group consisting of iron and its alloys, nickel and its alloys, and German silver which comprises passing an electric current from the metal or alloy selected from the group named as the anode through a solution of about 33 to 50% sulfuric acid and about 33 to 40% glycerine by weight, the remainder being largely water, and continuing to pass such electric current while of a sufficient density for a sufficient length of time to affect the polish of the metal or alloy.

Polishing of metal surfaces. C. L. FAUST (Battelle Memorial Inst.). U. S. 2,315,696, April 6, 1943 (Aug. 16, 1939).

Preparation of zirconium oxide. D. S. HAKE AND H. D. PRIOR (Titanium Alloy Mfg. Co.). U. S. 2,315,520, April 6, 1943 (Oct. 28, 1940).—A method of preparing zirconium oxide suitable for use as an opacifier for vitreous enamels comprising mixing sodium zirconium silicate with at least $2^1/_2$ parts of molten caustic soda to each part of sodium zirconium silicate, solidifying, leaching out soluble sodium and silicon compounds with water and acid, drying, and calcining.

Producing pigmented enamel articles. J. E. ROSENBERG (Hommelaya, Inc.). U. S. 2,317,114, April 20, 1943 (Oct. 28, 1940).—The method of producing one-coat enameled iron articles of red and yellow color adequately bonded to the iron which consists in spreading upon the surface of the iron article to be enameled a vitrifiable coating that carries an iron-eroding content of sodium antimonate, spreading upon such coating still in unfired condition a second coating that carries as a pigment a cadmium selenide, and firing the article so coated, whereby the iron-eroding content has unimpaired bonding effect and the unreacted pigment colors the surface of the fired article.

Treatment of zirconium oxide. D. S. HAKE AND H. D. PRIOR (Titanium Alloy Mfg. Co.). U. S. 2,315,519, April 6, 1943 (Oct. 16, 1940).—A method of treating zirconium oxide to render it suitable for use as an opacifier for vitreous enamels comprising mixing zirconium oxide and 2 to 10% of silica based on the weight of the zirconium oxide with at least $2^1/_2$ parts of molten caustic soda to each part of zirconium oxide, solidifying, leaching out soluble sodium and silicon compounds with water and acid, drying, and calcining.

Vitreous enamel charging and smelting apparatus. R. H. TURK (Porcelain Enamel & Mfg. Co.). Can. 411,511, March 30, 1943 (Oct. 24, 1941). G.M.H.

Vitreous enamel melting and fining method. R. H. TURK (Porcelain Enamel & Mfg. Co.). Can. 411,510, March 30, 1943 (Oct. 24, 1941). G.M.H.

Glass

Accelerated melting of glass batch. A. E. BADGER AND L. G. FARBER. *Glass Ind.*, **24** [2] 63–64 (1943).—Can a certain glass composition be melted more rapidly from a mixture of batches than from the single well-mixed batch? The quantity of heat needed to produce a glass by the two methods would be the same, but the rates of reaction and of fining may be different. Various proportions of sodium carbonate, calcium carbonate, and potter's flint were made into $^3/_{32}$-in. pellets and blended sixteen ways to yield the composition $72SiO_2$, $16Na_2O$, 12CaO. Platinum crucibles containing 10 gm. each of the batches were placed one at a time in a Globar electric furnace for 5 min. at 1375°C. Two particular batches were outstanding for rapidity of melting, and these were tested on a 1-lb. scale using refractory pots in a gas-fired kiln at 1450°C. for 20 min. The briquettes were $^3/_8$ in. square and $^1/_8$ in. thick. Both mixtures became quiescent before the singly mixed batch and were less seedy, and the seeds were larger. If factory-scale tests verify the laboratory evidence, the melting capacity of tanks could be increased by using briquetted batches of differing compositions instead of a single homogeneous mix. A.P.

Annealing of glass. W. A. WEYL AND A. G. PINCUS. *Jour. Applied Physics*, **14** [1] 37–39 (1943).—The rate of removal of mechanical strain should follow Maxwell's first-order law, but for glasses it has been found that the rate is proportional to the square of the birefringence. The authors explain this in terms of the structural picture of glass. During annealing, the stress-optical constant of the glass, as well as its viscosity, undergoes a continuous change. Birefringence is not a correct measure of the stress, and the Adams-Williamson findings are only ap-

parently in contradiction to the classical derivation of Maxwell. A.P.

Controlled humidity steps up production of army gun sights. ANON. *Glass Ind.*, **24** [3] 116 (1943).—By controlling the rate of change of humidity so that it is rising when glass surfaces are being cleaned, Minneapolis-Honeywell Regulator Co. engineers have simplified this production problem. All traces of grease and oil must be kept from the glass and metal parts of gun sights if filming is to be avoided. A.P.

Decolorization and fining in the absence of arsenic. ANON. *Glass Ind.*, **24** [3] 107, 127 (1943).—Any substitutes for arsenic must provide a substantial and satisfactory volume and pressure of oxygen at the right moment. Antimony can be substituted for arsenic, but it requires more niter and gives off its oxygen at lower temperatures. Chlorates and peroxides can replace saltpeter. Sodium sulfate replaces the couple arsenic-niter but must be used with care. Tenths of 1% of CeO_2 improve the action of the sulfate, but traces of arsenic must be avoided or solarization will be caused. A.P.

Glass. FERDINAND WINTERSBERGER. *Tech. Niederdonau*, **3**, 256–68 (1941); abstracted in *Chem. Zentr.*, **1942, I** [21] 2693.—A general survey of the composition, classification, production, and refining of glass in Gau Niederdonau is presented. M.V.C.

Glass fiber as substitute material. ANON. *Glaces & Verres*, **14** [67] 8–12 (1941); abstracted in *Chem. Zentr.*, **1942, I** [21] 2693.—Glass wadding as a versatile insulating material is discussed. M.V.C.

Glasshouse gremlins, a scientific study of. ANON. *Glass Ind.*, **24** [3] 105–106, 123 (1943).—Many defects and difficulties encountered in manufacturing glass products are not due to any ordinary practical or scientific fact, but to gremlins. They are to be found in every glasshouse operation. 5 photographs. A.P.

Glassmaking materials of Rajpur neighborhood, Dehra Dun District, United Provinces. H. L. CHHIBBER AND M. L. MISRA. *Trans. Indian Ceram. Soc.*, **1** [3] 159–66 (1942).—With the development of the glass industry in India, the detailed investigation of available glassmaking materials becomes imperative. The physical and geological features, megascopic and microscopic characteristics, grain size, chemical composition, and extent of deposits of materials occurring in Dehra Dun District are reported. It is concluded that the following available materials would furnish excellent glassmaking sands: (*a*) quartzites and quartzitic sandstones, (*b*) white decomposed friable sandstones, and (*c*) quartz grit with fine fragments of white quartz. Limestone occurrence in this district is also discussed briefly. P.S.D.

Is there a carbon yellow glass? What is the coloring constituent in the so-called carbon or sulfur yellow glass? L. SPRINGER. *Glashütte*, **72**, 13–15 (1942); abstracted in *Chem. Zentr.*, **1942, I** [21] 2693.—From a review of literature on the subject and from the results of several fusion tests which are briefly described, S. concludes that there is no such thing as carbon yellow glass (with pure C as the coloring ingredient), but only a sulfur yellow glass. The coloring compounds are alkali polysulfides with more or less large quantities of sulfoferrite. M.V.C.

Optical glass. S. G. MEHENDALE. *Trans. Indian Ceram. Soc.*, **1** [3] 206–208 (1942).—A borosilicate crown glass was melted in an oil-fired furnace in a 10-lb. crucible. The sample of glass was seed-free, and its refractive index and dispersion were in good agreement with those of foreign glasses. Fine striae, however, were visible under physical tests. P.S.D.

Photoluminescence in glass. A. R. RODRIGUEZ, C. W. PARMELEE, AND A. E. BADGER. *Jour. Amer. Ceram. Soc.*, **26** [5] 137–50 (1943).—30 references, 16 figures.

Possible use of suspended roofs and walls in glass furnaces. L. S. LONGENECKER. *Jour. Amer. Ceram. Soc.*, **26** [5] 167–72 (1943).—7 figures.

Research digest. ANON. *Glass Ind.*, **24** [1] 24, 35 (1943).—Outstanding papers of practical interest appearing during 1942 are reviewed. A.P.

Streamlined plant layout distinguishes new Knox unit. E. A. SCHRAG. *Glass Ind.*, **24** [1] 15–16, 34 (1943).—At Lincoln, Ill., the Lincoln Glass Bottle Co., ninth unit in the Knox group of glass-container factories, began operations in October, 1942. Seventy-five tons of amber glass are being drawn daily in a plant layout marked by straight-line production. Ware discarded in packing is automatically conveyed to an outside storage bin. A pit underneath the furnace permits drainage of glass for furnace repairs. The glass level is measured electrically. A.P.

BOOK

Prism and Lens Making. F. TWYMAN. Adam Hilger, Ltd., London, 1942. 178 pp., 70 figs. and diagrams. Price, cloth, $4.50.—Methods of optical working in glass as carried out in the optical workshops of Adam Hilger, Ltd., are described. This book is a useful handbook for the learner and apprentice and is especially valuable as a means for establishing a standard practice for yielding reproducible results of high quality. T. has been responsible for many of the innovations described, and his long experience as head of Adam Hilger, Ltd., enables him to speak with authority of the merits of the systematic practices he advocates. The book will be of special interest to those responsible for the training of new employees in industry. In addition to the actual work of manufacture, methods and standards of inspection and test are fully dealt with. A glossary of terms used in prism and lens making is included.

PATENTS

Apparatus for fiberizing fusible inorganic substances and forming the fibers into bats. B. C. MCCLURE (Owens-Corning Fiberglas Corp.). U. S. 2,318,243, May 4, 1943 (Aug. 21, 1939).

Apparatus for forming glass with conducting means molded in place. H. K. RICHARDSON AND L. D. MORAND (Westinghouse Electric & Mfg. Co.). U. S. 2,315,292, March 30, 1943 (Oct. 15, 1938).

Apparatus for grinding optical glass. HAROLD SOLODAR. U. S. 2,316,109, April 6, 1943 (April 14, 1942).

Apparatus for producing mineral wool. JOHN PAGE (U. S. Gypsum Co.). U. S. 2,316,451, April 13, 1943 (Nov. 18, 1939).

Apparatus for removing marginal portions of glass units. WILLIAM OWEN (Pittsburgh Plate Glass Co.). U. S. 2,316,532, April 13, 1943 (June 20, 1940).

Cellular glass and process for its manufacture. M. A. POWERS. U. S. 2,316,749, April 13, 1943 (Nov. 10, 1938).—The process of transforming glass tubing while plastic comprising pinching the tubing at intervals to produce a series of sealed spaces, expanding the spaces by the application of heat, flattening the walls of the spaces to produce spaces of even thickness, and dividing the product into sections.

Fiberizing mineral substances by centrifuge and blast. B. C. MCCLURE (Owens-Corning Fiberglas Corp.). U. S. 2,318,244, May 4, 1943 (Aug. 21, 1939).

Glass-bending apparatus. H. J. GALEY (Pittsburgh Plate Glass Co.). U. S. 2,317,904, April 27, 1943 (March 11, 1941).

Glass composition and batch. A. K. LYLE. Can. 410,942, March 9, 1943 (May 6, 1941). G.M.H.

Glass-fiber strand production. PIERO MODIGLIANI (Fiberglas Canada, Ltd.). Can. 410,999, March 9, 1943 (March 7, 1939). G.M.H.

Glassforming machine. A. F. MCNISH (John Moncrieff, Ltd., assignee of one-half interest). Can. 411,551, March 30, 1943 (Jan. 7, 1942). G.M.H.

Glass manufacture. S. J. EVERETT. Can. 411,370, March 30, 1943 (Dec. 26, 1941). G.M.H.

Glass run guide fabricating apparatus. G. T. BALFE (Detroit Gasket & Mfg. Co.). Can. 411,115, March 16, 1943 (Nov. 5, 1941). G.M.H.

Glass-to-metal seal and eyelet for constructing. S. H. STUPAKOFF AND F. R. PRESCOTT (Stupakoff Laboratories, Inc.). U. S. 2,318,435, May 4, 1943 (Aug. 2, 1940).

Glass-shaping machine. W. B. MITCHELL (Mitchell Glass Co., Ltd.). U. S. 2,316,969, April 20, 1943 (June 29, 1939).

High silica glass article. H. P. HOOD AND M. E. NORDBERG (Corning Glass Works). U. S. 2,315,328, March 30, 1943 (Nov. 4, 1938).—A composite article comprising a uniform skeleton structure of glass having a multiplicity of interconnecting submicroscopic pores extending throughout the mass and communicating with the outer surfaces of the article and a material other than glass deposited throughout the pores of at least a portion of the skeleton and imparting to that portion different physical characteristics from those possessed by the glass skeleton.

Lehr conveyer. G. W. BATCHELL. U. S. 2,315,148, March 30, 1943 (April 15, 1941).

Making composite glass articles. H. P. HOOD AND M. E. NORDBERG (Corning Glass Works). U. S. 2,315,329, March 30, 1943 (Nov. 4, 1938; April 25, 1940).—The method of making a composite glass article which comprises melting a glass, fabricating it into a fixed shape, separating such glass into two phases by heat-treatment, dissolving out one of the phases in an acid bath while leaving the other phase undissolved in a rigid substantially transparent porous structure, treating the article with a solution of a colored material to deposit the material in the pores, and filling the pores with a viscous liquid having a higher boiling point than water.

Manufacture of mirrors. E. J. BALLINTINE (Pittsburgh Plate Glass Co.). U. S. 2,317,876, April 27, 1943 (March 31, 1941).

Manufacture of mirrors. E. J. BALLINTINE (Pittsburgh Plate Glass Co.). U. S. 2,317,877, April 27, 1943 (April 26, 1941).—In the process of manufacturing mirrors which includes the deposition of metallic silver from a solution of a silver salt and a reducing agent upon the upper surface of a glass sheet maintained substantially in a horizontal position, the steps which comprise applying an acidulated solution of a compound selected from the group consisting of $K_2Cr_2O_7$, $Na_2Cr_2O_7$, $(NH_4)_2Cr_2O_7$, $NaMnO_4$, and $KMnO_4$ to the under surface of the glass sheet to prevent adherence thereon of silver from the silvering solution overflowing the upper surface and contacting the under surface of the glass, depositing the metallic silver upon the upper surface while the under surface is covered with the compound, and then washing away the compound.

Means for and method of manufacturing mineral wool products by the dry process. D. C. DRILL (American Rock Wool Corp.). U. S. 2,317,895, April 27, 1943 (March 3, 1941).

Measuring dispenser. F. E. WOLCOTT (Silex Co.). U. S. 2,315,473, March 30, 1943 (March 30, 1940).

Method of and apparatus for blowing mineral wool. C. D. RICHARDSON (National Gypsum Co.). U. S. 2,315,735, April 6, 1943 (May 15, 1940).

Method of and apparatus for producing filaments, etc., of glass and structures thereof. ARMAND LAMESCH (vested in the Alien Property Custodian). U. S. 2,314,944, March 30, 1943 (Sept. 23, 1937).—A method of producing a mat of threads from material having the consistency of molten glass which consists in extracting individual drops or particles from a mass of the material, throwing the particles away from the mass, in substantially parallel directions, while still connected by threads to the mass and thereby drawing a plurality of substantially parallel threads, and cutting off the particles and dropping the threads in substantially parallel relation upon a support.

Minimizing breakage of glass during the production of surfaced continuous strips of glass. F. B. WALDRON AND J. H. GRIFFIN (Pilkington Bros., Ltd.). U. S. 2,315,885, April 6, 1943 (March 21, 1942).

Plastic composition for laminated glass sheets. B. M. MARKS (Canadian Industries, Ltd.). Can. 411,432, March 30, 1943 (July 5, 1940; in U. S. July 13, 1939). G.M.H.

Treating glass fibers. J. F. HYDE (Owens-Corning Fiberglas Corp.). U. S. 2,315,259, March 30, 1943 (April 15, 1940).

Structural Clay Products

European structural clay products. FRANK C. SONNENSCHEIN. *Brick & Clay Record*, **102** [3] 29–31 (1943).—Reinforced concrete floor construction with clay tile fillers is used to a much greater extent in Europe than in this country. In the Swiss floor system, hollow clay units are laid "suspended" between steel beams, the space above the beam being filled with concrete. Precast beams made from clay tile have been used for some time. A nailable type of tile is shown. The various types of shapes are illustrated. B.C.R.

Young's modulus of elasticity of some fired brick clays. L. R. BARRETT. *Trans. Brit. Ceram. Soc.*, **42** [2] 16–20 (1943).—Results on linear firing contraction, apparent porosity, and Young's modulus are given for specimens made of stoneware clay, surface clay, and shale fired at various temperatures from 105° to 1214°C. R.A.H.

PATENTS

Building tile. W. G. DEMAREST. U. S. 2,316,319, April 13, 1943 (Jan. 28, 1941).

Building tile and tiled wall, etc. A. M. BURDON-COOPER. Brit. 551,400, March 3, 1943 (July 15, 1939).

Refractories

Behavior of low-fired grog block in tunnel kilns. T. P. DERID. *Ogneupory*, **9**, 171–73 (1941); abstracted in *Chem. Zentr.*, **1942, I** [21] 2693.—Linings for tunnel kilns were tested in a Russian factory. Block made by molding low-fired grog showed a series of fundamental defects after the kiln tested had been in operation for 19 months. In the zones of hardest wear considerable alteration of the body structure and an increased deformation were observed, and the joints in the lining had become enlarged in such a way that the material was exposed to all the detrimental effects of high temperatures. The kiln was fired with insufficiently preheated producer gas, which subjected the lining material to great strains. M.V.C.

Factors affecting the design of open-hearth furnaces. A. H. LECKIE. *Iron & Coal Trades Rev.*, **146** [3917] 451–55 (1943).—Principles of design, gas flow in furnaces, furnace pressures, and heat in the different furnace parts and the application of these principles to large tilting furnaces are discussed. 23 references. M.Ha.

Investigation of the permanent expansion of silica products containing cristobalite. G. R. RIGBY, A. E. DODD, R. P. WHITE, AND A. T. GREEN. *Trans. Brit. Ceram. Soc.*, **42** [2] 11–16 (1943); see *Ceram. Abs.*, **21** [10] 214 (1942). R.A.H.

Methods of testing the consistency of refractory mortars and protective masses. R. R. MATVEEV. *Ogneupory*, **9**, 110–18 (1941); abstracted in *Chem. Zentr.*, **1942, I** [21] 2694.—To determine the consistency of mortars and masses for protective layers of furnace linings and to obtain an even surface by the simplest work method, research was undertaken in which two consistometers and the best working consistency for the masses were tested. The Abramson apparatus with a cone and the apparatus of Cohn based on the principle of the ball impression are described. M.V.C.

Properties of heat-setting refractory mortars. RAYMOND A. HEINDL AND WILLIAM L. PENDERGAST. *Jour. Research Nat. Bur. Standards*, **30** [4] 303–10 (1943); RP

1534. Price 5¢.—Twelve refractory mortars of the heat-setting type supplied by 8 manufacturers were investigated. The mortars were finely ground, as received; only one contained as much as 2% of material that would not pass a No. 20 sieve. The refractoriness was above cone 30 in all but one case. The mixing water ranged from 21 to 41.5%. The consistencies of the mortars as indicated by the flow-table test, were, with 3 exceptions, within a narrow range. The ease of troweling on brick, determined mechanically, was considered satisfactory except for one mortar. After troweling and drying, 3 mortars failed to adhere to the brick, but cracking was absent in all but 2 cases and these were not serious. These 2 mortars also had the highest drying shrinkages. The average modulus of rupture of the neat mortars dried at 105°C. ranged from 0 to 290 lb./in.²; of those heated at 1350°C., from 350 to 4720 lb./in.²; and of those heated at 1500°C., from 1705 to 5550 lb./in.². In the transverse tests, the bonding strength of the mortars in assemblies of two half-brick and mortar, heated at 1350°C. and cooled, was poor, as indicated by the lack of strength of 8 of the 12 mortars. After heating at 1500°C., satisfactory bonding strength was shown by 8 of the 12 mortars. When mortars were tested for their bonding property by grasping the upper brick in a pier made up of 3 brick and mortar and lifting it, only 2 mortars failed after the 1350° heat-treatment and only one after the 1500°C. treatment. R.A.H.

Refractories life is increased by proper selection of binders. ANON. *Brick & Clay Record*, **102** [3] 48–50 (1943).—In general, binders are used for improving green bond and workability, dry strength and handling ability, and fired strength, for their action as a lubricant during forming operation, and as a plasticizer. Organic and inorganic binders in either liquid or solid state are used. The more common types of each are mentioned. Increased dry strength may be obtained by (1) a cementing action produced through the use of gums, resins, asphalt, gelatine, starches, glycerine, or a mixture of diatomaceous earth with a glue, casein, or sulfite pitch, and by the addition of electrolyte to the adhesives to obtain a more gelatinous mass; (2) denser structure resulting from the deflocculation of the clay; and (3) crystallization of a binder such as sugar, borax, borates, chlorides, and other salts. Binders for fired purposes include alkalis, salts, oxides, silicates, and clay. Carbon obtained from organic materials is a superior bond for certain types of refractories, but it requires the addition of a suitable fusing agent to act as a protective coating against oxidation. B.C.R.

Refractories in review—1942. LOUIS A. SMITH. *Blast Furnace & Steel Plant*, **31** [1] 81–83 (1943).—Super brick is displacing conventional materials in the more severe parts of furnaces. There are favorable reports on the use of high-fired super clay brick in linings of large mixer-type iron ladles. Results with suspended basic roof sections are not good. Imported chrome ore may be replaced partly by magnesite. The use of prepared bottom refractories is increasing. Longer sleeves are being produced by a new process. See "Clay . . .," *Ceram. Abs.*, **22** [5] 73 (1943). B.L.

Refractory coating material. ANON. *Brick & Clay Record*, **102** [3] 54 (1943).—A protective coating material, Cromax, has been developed by the Federal Refractories Co. to be applied to firebrick, insulating brick, and castable refractories. Being a liquid, it may be applied by brushing, dipping, or spraying. It can be used at temperatures up to 3000°F. B.C.R.

***Selection of refractory materials for boiler masonry.** R. RASCH. *Wärme*, **65** [27] 246–47 (1942).—R. discusses the points to be observed in selecting brick. A high resistance to slag attack is especially necessary; firebrick with an alumina content of more than 40% and a porosity of 20 to 25% should be used for this purpose. Temperature effects (changes in length) should be minimized as much as possible by correct design. Several examples are described. M.HA.

* Obtained from microfilm.

BOOK

Refractories. F. H. NORTON. McGraw-Hill Book Co., Inc., New York, 1942. 2d ed. 798 pp. Price $7.50.—The second edition of this volume contains 24 chapters classified in four sections as follows: (1) introductory, dealing with the history and economics of the refractories industry and the literature on refractories; (2) raw materials, their methods of preparation and manufacture into finished products; (3) properties of refractories; and (4) the use of refractories in various industries. F.G.H.

PATENTS

Cellular structural material and method of producing. ISAAC HARTER, C. L. NORTON, AND C. L. NORTON, JR. (Babcock & Wilcox Co.). U. S. 2,318,574, May 4, 1943 (Jan. 26, 1939).—An insulating shape formed by a molded foamed mixture of ceramic refractory material, a quick-setting cementitious material, sawdust, an alkyl sulfuric acid ester foaming agent, and an amount of water equal to over 50% of the total weight of the other constituents of the mixture, and having, after being fired, a cellular porous stable indurated structure weighing less than 25 lb. per cu. ft. and a thermal conductivity approximately one-sixth that of first-quality firebrick.

Chrome-magnesia refractory and method. JOSEF BERLEK (vested in the Alien Property Custodian). U. S. 2,316,229, April 13, 1943 (Jan. 8, 1938).—70% of chromite, 30% of magnesite. Analysis of the chromite: SiO_2 4.29, Fe_2O_3 16.75, Al_2O_3 22.12, Cr_2O_3 39.21, Mn_3O_4 0.19, CaO 0.10, and MgO 15.70%; loss on ignition 1.64%. In the process of making chromite-magnesia brick having great spalling resistance, slag resistance, and strength at high temperatures and fair strength at atmospheric temperature, the improvement which comprises composing a charge consisting essentially of ground chromite and ground magnesia and preponderantly containing chromite in such a manner that the mix will contain about 20 to 40 parts of magnesia meal reduced by special fine grinding to such a degree of fineness that it preponderantly contains particles not exceeding a size of 0.06 mm. and about 60 to 80 parts of chromite substantially freed from the finest particles up to an upper limit of at the least about 0.1 mm. and at the most about 0.5 mm., adding a binding substance, molding the mixture into brick, and firing the molded bodies.

Heat-resistive material, especially building material, and method of making. V. M. GOLDSCHMIDT AND K. J. STENVIK (vested in the Alien Property Custodian). U. S. 2,315,198, March 30, 1943 (Oct. 15, 1940).—A refractory comprising a mixture of a material rich in magnesium orthosilicate and Portland cement, the material being in excess of the cement.

Magnesia refractory for brick and furnace linings. N. P. PITT AND LISLE HODNETT (Canadian Refractories, Ltd., and the Honorary Advisory Council for Scientific and Industrial Research). Can. 410,778, Feb. 23, 1943 (July 20, 1940).—A refractory material comprises periclase, a minor proportion of dicalcium silicate, and between 2.4 and 15.6% of magnesium compound of metal oxide. G.M.H.

Means for reinforcing refractory furnace walls, etc. R. T. GILES. U. S. 2,317,451, April 27, 1943 (Aug. 1, 1940).

Panel furnace construction. M. P. YOUKER AND W. H. CREEL (Phillips Petroleum Co.). U. S. 2,315,833, April 6, 1943 (Sept. 28, 1939).

Production of chromite blocks. KONRAD ERDMANN (vested in the Alien Property Custodian). U. S. 2,316,228, April 13, 1943 (Dec. 28, 1936).—In the process of making chromite-magnesia brick having unprecedented spalling resistance, great slag resistance and strength at high temperatures, and fair strength at atmospheric temperatures, the improvement which comprises adjusting the proportion of the sizes of particles in a material consisting essentially of ground chromite and ground magnesia in which the amount of the chromite is between 60 and 80% in such a manner that the mixture will contain at least

about 20 to 40 parts of a fine fraction composed of particles of a size below 100 μ (passing through a 150-mesh per linear in. screen), not over 15 to 25 parts of an intermediate fraction composed of particles of a size between about 100 μ and about 1000 μ (between a 150- and 16-mesh per linear in. screen), and at least about 35 to 65 parts of a coarse material composed of particles of a size above about 1000 μ (retained on a 16-mesh per linear in. screen), substantially all of the magnesia being in a fine condition below about 100 μ (passing through a 150-mesh per linear in. screen), whereas the fine fraction below about 100 μ contains substantially no chromite, molding the mixture into brick, and firing the brick.

Refractory body. L. H. HEPNER AND R. E. TUCKER (Crane Co.). U. S. 2,317,855, April 27, 1943 (May 9, 1940).—In a semiporcelain once-fired grog sanitary ware made from a mixture of approximately 42% clay, approximately 40% of prefired clay, and approximately 17% of alumina.

Stabilized magnesia recovery. N. P. PITT, C. H. ROCKCLIFFE, AND F. E. LATHE (Canadian Refractories, Ltd., and the Honorary Advisory Council for Scientific and Industrial Research). Can. 411,352, March 23, 1943 (July 18, 1940).—An improved refractory comprises a fired mass consisting of at least 64% periclase in dense, stable form, intimately associated with a matrix consisting essentially of dicalcium silicate, together with a dead-burning agent to stabilize the periclase and render the matrix nondusting. G.M.H.

Sulfated calcined dolomite. W. H. MACINTIRE (American Zinc, Lead & Smelting Co.). Can. 411,407, March 30, 1943 (Jan. 11, 1940; in U. S. Feb. 4, 1939). G.M.H.

Terra Cotta

Production of architectural mosaic. G. L. EFREMOV. *Prom. Stroitel. Materialov*, **1941**, No. 1, pp. 36–40; *Khim. Referat. Zhur.*, **4** [7–8] 96 (1941). M.Ho.

Simplified thermal-expansion rings for production control in terra-cotta manufacture. T. E. NICHOLSON AND FRED L. GOIN. *Jour. Amer. Ceram. Soc.*, **26** [5] 163–67 (1943).—8 references, 7 figures.

Whiteware

Technical control of glazing by dipping and other methods. A. J. DALE AND M. FRANCIS. *Tech. Paper Brit. Pottery Research Assn.*, 1938; reprinted in *Trans. Brit. Ceram. Soc.*, **41** [7] 167–90 (1942).—This is an introductory paper to the study of the technique of glazing and of the control of slip glazes and slips in general. The treatment of slip glaze to give thin glaze layers on ware of high absorption or thick layers, when required, on ware of low or zero absorption, such as vitreous china, electrical porcelain, or leather-hard green goods, is explained. The important effects which overgrinding can produce in slip glaze of the low-solubility type were investigated, and the results are given. Experimental results are adduced to show that with certain slip glazes the greater the rate of withdrawal of the dipped article after immersion, the greater is the weight of the glaze picked up. The conditioning of slip glaze so that the dried glaze film can be roughly handled without defacement is described, and attention is directed to the value of additions to slip glazes of colloids other than gelatin. The preparation of slip glaze which is quite fluid at high slip weight, yet is free from such faults as settling, setting, and livering, is outlined. R.A.H.

Technique of sticking handles to earthenware articles. P. R. SHAH. *Trans. Indian Ceram. Soc.*, **1** [3] 175–76 (1942).—Essential requirements for properly attaching handles to earthenware shapes are briefly discussed. Attention is given to experiences with deaired earthenware bodies. P.S.D.

PATENTS

Electrical insulators. LODGE PLUGS, LTD., B. HOPPS, AND C. J. SMITHELLS. Brit. 551,421, March 3, 1943 (Nov. 13, 1941).

Insulator seal. KARL SCHWARTZWALDER AND R. W. SMITH (General Motors Corp.). U. S. 2,317,305, April 20, 1943 (July 5, 1941).

Refractory setter. LESLIE BROWN (Lenox, Inc.). U. S. 2,315,395, March 30, 1943 (Oct. 15, 1940).—A setter for use in the initial firing of vitrified translucent flat ware such as fine porcelain, etc., the setter comprising an imperforate hub to oppose the center of an inverted clay piece and an imperforate annularly true depressed flange, the flange being depressed to an extent such that it is adapted to engage continuously the rim of the clay piece during the entire firing operation and to support the central portion of the clay piece in spaced relation to the opposed surface of the hub until the firing has been substantially completed, the hub affording a support for the clay piece during only the final portion of the firing period whereby to prevent deformation of the central portion of the ware during that period when it is in a semiplastic condition.

Spark plug. A. C. WALL (General Electric Co.). U. S. 2,318,440, May 4, 1943 (April 28, 1941).

Equipment and Apparatus

Alternating-current apparatus for measuring dielectric constants. BOYD E. HUDSON AND MARCUS E. HOBBS. *Rev. Sci. Instruments*, **13** [4] 140–43 (1942).—A heterodyne-beat apparatus operating on alternating current is described. The essential features are (1) a crystal-controlled oscillator, (2) a variable-capacitance oscillator, and (3) the power supply. By properly choosing plate potentials and by using a line-voltage stabilizer, the effects of normal voltage variations have been essentially eliminated. The frequency stability is found to be quite good, and the time of warm-up rather short. Special care was given to rigidity of mountings and to thermostating of both oscillators. Circuit details are shown in figures. R.H.B.

Analytical cell for the ultracentrifuge. MORRIS ROSENFELD. *Rev. Sci. Instruments*, **13** [4] 154–57 (1942).—Sedimentation of materials in the ultracentrifuge can be measured by optical and by analytical methods. An analytical cell has been designed for the angle-type quantity rotor of the air-driven ultracentrifuge. Sievelike partitions covered with filter paper separate the cell into two or three compartments from which fractions can be removed for chemical analysis or for bio-assay. Fourteen tubes, each containing 4.5 cc. of solution, can be run simultaneously. Equations have been derived for the calculation of sedimentation constants from the analytical data. R.H.B.

Applications of near infrared spectrophotometry. E. I. STEARNS. *Jour. Optical Soc. Amer.*, **33** [1] 27–30 (1943).—The commercial General Electric spectrophotometer has been modified to afford automatic recording over the range 375 to 1200 μ. This extended range has been found useful in the analysis of colorless materials, the identification of dyes, and the formulation of infrared paints. A.P.

Belt-drive chart. W. F. SCHAPHORST. *Chem. Industries*, **52** [3] 349 (1943).—A chart is presented for a variety of

drive problems involving flat belts, V belts, chains, ropes, cables, gears, etc. A nomogram gives the relation between the diameter of the pulley in inches, pounds pull per horsepower, and revolutions per minute. E.D.M.

Design of the Minnesota electrostatic generator. J. H. WILLIAMS, L. H. RUMBAUGH, AND J. T. TATE. *Rev. Sci. Instruments*, **13** [5] 202–207 (1942).—A description is given of a voltage generator and ion tube which are enclosed in a vertical 100 lb. per in.^{2} pressure enclosure 18 ft. in diameter. Performance characteristics, voltage steadiness, and limitations to a present maximum of 3 mv. are discussed. R.H.B.

Determination of the particle-size distribution of Portland cement with a specially calibrated pipette. G. E. MONFORE. *ASTM Bull.*, No. 120, pp. 27–31 (Jan., 1943).—The procedure used in making particle-size determinations is outlined, and the results of tests made to determine the following are given: (1) variation due to changes of deflocculating agent and suspension medium, (2) reproducibility of the method, (3) particle-size distributions of 21 cements and values of specific surfaces as determined from pipette analyses, air-permeability measurements, and Wagner turbidimeter analyses, (4) effective aperture of the No. 325 sieve, and (5) values of specific surface from pipette analyses and turbidimeter analyses when calculated on the same basis. B.C.R.

Direct pen recording of galvanometer deflections. D. J. POMPEO AND C. J. PENTHER. *Rev. Sci. Instruments*, **13** [5] 218–22 (1942).—An instrument is described which records directly the deflections of a light-beam pointer without recourse to photographic-development processes. The recording is easily accomplished at pen speeds of 12.7 cm. per sec. across 25 cm. of chart without "hurting" taking place. The pen is made to follow the light beam from an external galvanometer by mounting a double cathode phototube on the pen carriage so that both move as a unit. By means of vacuum-tube amplifiers operating a reversible motor, the pen carriage moves to the left when the light beam deflects to the left on the left phototube cathode and to the right when the right phototube cathode is exposed. A movement of the light beam as small as 0.1 mm. causes a corresponding movement of the pen. The instrument has been satisfactorily used, with considerable saving in time, for recording current-voltage curves in polaragraphic analysis, for obtaining infrared absorption curves, and for recording ion currents in mass spectrographic work. R.H.B.

Electron microscopy in chemistry. VLADIMIR K. ZWORYKIN. *Ind. Eng. Chem.*, **35** [4] 450–58 (1943).—The applications of electron microscopy to chemistry are illustrated by a number of micrographs of chemical materials. Methods of obtaining electron stereomicrographs and electron-diffraction patterns with the electron microscope are described. A high-voltage electron microscope is discussed. The replica technique for obtaining electron micrographs of metallurgical specimens is described, and the results of several techniques are shown. The scanning electron microscope and the development of a small electron microscope are discussed briefly. Illustrated. See "Scanning . . . ," *Ceram. Abs.*, **22** [3] 56 (1943). F.G.H.

Fine structure of metallic surfaces with the electron microscope. R. D. HEIDENREICH AND V. G. PECK. *Jour. Applied Physics*, **14** [1] 23–29 (1943).—A new two-step process for producing surface replicas to be used in the transmission electron microscope utilizes molded polystyrene as the first replica and evaporated silica as the second thin-film replica. The high mobility of condensing silica vapor on polystyrene tends to fill in small surface irregularities and produce a reliable replica of fine surface structure. Electron micrographs illustrate steel and alloy structures and a calcite cleavage plane. A resolution of 50 a.u. is demonstrated in the latter. A.P.

Glass-fiber insulation increases brass-furnace output. ANON. *Machinery* [N. Y.], **49** [6] 179 (1943).—Fiberglas tape is being substituted for mica as a coil insulation in induction-type brass furnaces. R.H.B.

Glass precision gauges. H. B. HAMBLETON. *Glass Ind.*, **24** [2] 69, 78 (1943).—Although a wartime development to conserve critical tool steel, glass gauges are expected to become a permanent fixture in industrial postwar manufacturing. Research conducted by the U. S. Army Ordnance Department has proved glass gauges superior to steel gauges. Any composition of glass is acceptable which meets the specifications for hardness, abrasion resistance, and dimensional stability. The low thermal conductivity, low and variable expansion coefficient, and chemical durability of glass are also advantageous. Glass gauges also offer greater visibility, ease of handling, and freedom from seizing. See *Ceram. Abs.*, **22** [5] 70 (1943). A.P.

Glass windows for iron engines; special construction makes study of internal combustion possible. E. W. LANDEN. *Glass Ind.*, **24** [1] 21–23, 33 (1943).—Experiments with internal-combustion engines and with high-pressure apparatus are aided by glass windows in cylinder wall or engine head, either for visual observation and photography or for spectroscopic measurements. A.P.

Grid-controlled X-ray diffraction tube. A. EISENSTEIN. *Rev. Sci. Instruments*, **13** [5] 208–12 (1942).—A grid imposed between the filament and target of a demountable high-vacuum type X-ray tube is modulated in synchronism with the full-wave rectified voltage impressed on the tube by means of a square-wave generator. The grid potential varies in such a manner that the electron current flows only when the voltage is sufficiently high to excite the K series. For the Mo Kα radiation at 30.8-kv. peak voltage, an increase in efficiency of 29% is realized with the grid modulated. With a peak voltage of 38.2 kv., a gain in efficiency of 18% is noted, or the X-ray intensity may be increased by this amount without altering the target heating. R.H.B.

Kestner axial flow fans. ANON. *Chem. & Ind.*, **62** [3] 24 (1943).—Recent advance in the knowledge of applied aerodynamics has enabled engineers to design drafting fans for high volumes at relatively low pressure which surpass in efficiency any hitherto produced. These fans are of the axial-flow type in which the impeller, carrying a number of accurately shaped aerofoil section blades, rotates in a cylindrical casing, imparting a forward motion to the flow of gas in a direction parallel to the axis of the impeller. The Kestner Evaporator & Engineering Co., Ltd., has developed a complete range of axial-flow fans in all sizes from 4 in. to 4 ft. in diameter, built entirely of acid-resisting materials. These fans have found wide use in exhaust hoods in chemical and manufacturing plants. R.H.B.

Lindberg forced-convection heat-treating furnace. ANON. *Machinery* [N. Y.], **49** [5] 182 (1943).—The Lindberg Engineering Co., Chicago, Ill., has developed a new type of forced-convection, heat-treating furnace with a heat capacity of 1750°F. The furnace is particularly adapted to hardening, annealing, normalizing, tempering, nitriding, etc. R.H.B.

Maintenance steps to prolong instrument life. THEODORE A. COHEN. *Chem. Industries*, **52** [3] 345–47 (1943).—Responsibility for instrument maintenance should be centralized. The instruments should be properly located away from vibration and protected from dirt. Excessive temperatures, corrosive atmospheres, dampness, and magnetic fields should be avoided. Pressure instruments which are usually exposed directly to the action of the gas whose pressure is being measured may require special attention. Pyrometers and thermocouples are considered separately with regard to the special problems of heat, corrosion, and protecting tubes for the thermocouples. The question of immersion is also discussed. E.D.M.

Photoelectric colorimeter for rapid reactions. BRITTON CHANCE. *Rev. Sci. Instruments*, **13** [4] 158–61 (1942).—A differential photoelectric colorimeter was built for the high-speed measurement of small absorption changes in enzyme substrate reactions. Under the conditions of the experiments, the total differential change of light intensity was approximately 0.2%, and a photoelectric resolution of approximately 1.7×10^4 was achieved, giving an accuracy

of 3%. The time resolution of the system was at least 0.01 sec., and a complete kinetic curve was obtained with as little as 0.5 cc. of peroxidase solution of 1×10^{-6} molar hematin iron. R.H.B.

Preparation of purified inorganic compounds for use in spectrographic standards. R. C. HUGHES. *Jour. Optical Soc. Amer.*, **33** [1] 49–60 (1943).—Suitable methods for the preparation of purified compounds of magnesium, calcium, potassium, sodium, and silicon are described in detail. The relative efficiency, convenience, and costs of various methods are compared. A.P.

Propagation of radiation in a scattering and absorbing medium. E. O. HULBURT. *Jour. Optical Soc. Amer.*, **33** [1] 42–45 (1943).—The theory of the passage of light in a medium that scatters and absorbs, including opal glasses, is developed. A.P.

Recording dilatometer. L. R. STANTON. *Iron & Coal Trades Rev.*, **146** [3910] 187–89 (1943).—S. describes an instrument that utilizes the changes in the resonant frequency of an electric circuit which is disturbed by the change in capacity of a quartz condenser connected to the metal sample to be measured; the expansion of the sample alters the capacity. M.Ha.

Recording photoelectric spectrophotometer. ANON. *Chem. Industries*, **51** [7] 901 (1942).—A diagram and a short description of a spectrophotometer designed by A. C. Hardy and produced by the General Electric Co. are presented. It records spectral-reflectance measurements as a percentage of a selected standard or spectral-transmission measurements directly or as a percentage of a standard sample. E.D.M.

Rolling-ball viscometer. ROBERT M. HUBBARD AND GEORGE GRANGER BROWN. *Ind. Eng. Chem., Anal. Ed.*, **15** [3] 212–18 (1943).—A study of the system of the inclined tube and rolling ball as applied to the measurement of viscosity is described. Dimensional analysis was used to derive general relations between the variables involved and the simple calibration for the rolling-ball viscometer in the streamline region of fluid flow. The coefficient of the calibration equation may be calculated from the dimensions of the instrument with the aid of an experimentally determined empirical factor. By using the equations given, the useful range of the rolling-ball viscometer may be predicted without experimental calibration, or an instrument may be designed for measurements over any desired range of viscosity. An empirical correlation is given which allows viscosity to be estimated from data taken on the viscometer in the turbulent region of fluid flow. The effect of temperature changes on the viscometer and its calibration is discussed. Illustrated. F.G.H.

Safety device in laboratory electric muffles. M. L. JOSHI AND SUKHCHAIN LAL JAIN. *Trans. Indian Ceram. Soc.*, **1** [3] 167–68 (1942).—Simple fuses made from alloys of silver and copper were inserted in the circuit of the electric furnace and proved successful as insurance against burned-out heating elements. P.S.D.

Simplified solution for four-component Jaenecke phase diagrams. H. BURAUS. *Jour. Phys. Chem.*, **45**, 968 (1941).—A method improved from the standpoints of time and precision is described. R.A.G.

Sources of error in precise commercial refractometry. LEROY W. TILTON. *Jour. Research Nat. Bur. Standards*, **30** [4] 311–28 (1943); RP 1535. Price 10¢.—Exclusive of compensators, the mechanical requirements for accurate refractometry to a few units of the fifth decimal place in index are difficult but not impracticable. Optical requirements are high, because the symmetrical use of all apertures is, in general, not possible. If it is necessary to distinguish between index of sample referred to air at t or at t_0, this usually can be done by the choice of a relative or an absolute temperature coefficient when correcting for temperature of the refractometer block. For an error of 1×10^{-5} in index of solids, the permissible prism of contact liquid is one-third fringe per centimeter as viewed in the exit pupil of the telescope. The requirements for minimum shielding of critically refracted rays, for absence of certain interference fringes in the field of view, and for surfacing of the illuminating prism are so related with reference to measurements on small samples of liquid that compromises are necessary in the design of precision refractometers. R.A.H.

Statistical analysis of size distribution of particulate materials, with special reference to bimodal and frequency distributions. Correlation of quartile with statistical values. P. S. ROLLER. *Jour. Phys. Chem.*, **45**, 241 (1941).—A size-distribution function has been developed to apply to new classes of materials such as mine-run ores, sand, atmospheric dusts, and photographic emulsions. The new features considered are the bimodal character of coarse size distributions and the representation of data on a number-frequency basis. Statistical constants which define a material as to size are (1) surface area per gram, (2) coefficient of uniformity, (3) coefficient of regression, and (4) number of particles per gram. A theoretical and practical comparison has been made of the statistical constants and the correspondingly easily determined quartile constants, and it is shown that the quartile constants, when a correction factor is applied, may be used to represent the statistical values. This is especially the case when the coefficient of uniformity is high (as in dusts, emulsions, and sand), but the agreement is comparatively rough when the coefficient of uniformity is low. R.A.G.

Synthetic white sapphires. JAMES M. CROWE. *Chem. Industries*, **51** [7] 869 (1942).—The mineral corundum, unpigmented and of gem quality, is now available from the Linde Air Products Co. in sizes up to 150 carats and in regular cylindrical shape. Imperfections are microscopic and have no effect on the quality of precision bearing surfaces. Mineralogically, the hardness of American white sapphires is exceeded only by the diamond; they are tough and melt at 3700°F. They are used in chronometers, compasses, and electrical fire control and aircraft instruments. They are chemically resistant, except to strong mineral acids and alkalis. See "Newly . . .," *Ceram. Abs.*, **21** [10] 211 (1942). E.D.M.

Temperature recorders. ANON. *Chem. & Ind.*, **62** [7] 63 (1943).—Sunvic Controls, Ltd., London, recently developed a series of temperature recorders operating on a somewhat novel principle and suitable for industrial and laboratory use where it is desired to secure a permanent time-temperature record. In the Sunvic ambient-temperature recorder, the conventional bimetal helix is replaced by a pair of bimetal strips supporting a floating differential roller to which the pointer arm and pen are attached. In addition, the recorder drum is accurately machined so as to be concentric and coaxial with the shaft. R.H.B.

Ultimate shape of pebbles, natural and artificial. RAYLEIGH. *Proc. Roy. Soc.* [London], **181A**, 107–18 (1942).—Flint pebbles that have been worn down enough to be symmetrical may be spherical or may approximate to prolate or oblate spheroids or to ellipsoids. The quasi-spheroidal pebbles are always flattened at the poles, and the very oblate ones may even become concave at the poles. Form changes in chalk pebbles under abrasion were experimentally observed. Steel nuts, tacks, and small shot were used, and the changes depended on the abrasive. The axes tend to approach equality, but not rapidly enough for a spherical form to be attained before the pebble has disappeared. Initially spheroidal shapes flattened or became concave at the poles just like the natural flint pebbles. Circumstances determining the rate of abrasion at any point are considered, and the origin of the concave form is shown from simple mechanical considerations. A.P.

Using available machine-tool equipment to best advantage. W. K. BAILEY. *Machinery* [N. Y.], **49** [6] 180–84 (1943).—B. presents a general discussion on the improvement of tools, equipment, and order of work in war plants. The difficulties that seem to be prevalent include (1) tool problems, such as improper choice, care, grinding, or setting, (2) fixtures out of balance, insufficiently rigid, etc., (3) inadequate or incorrect speeds and feeds, (4) unsatisfactory handling of operations on machines, (5) using the wrong size of machine for the job, (6) inadequate supervision of men making tool setups, (7) poor scheduling of

work through machining departments, and (8) confusion and loss of time at change of shifts. R.H.B.

BOOK

Micromeritics, the Technology of Fine Particles. J. M. DALLAVALLE. Pitman Publishing Corp., New York, 1943. 428 pp., 100 figs. Price $8.50.—This book gives the significant developments in particulate technology and attempts to standardize particle measurement. The behavior and characteristics of particles ranging in size from microscopic resolution to visibility by the naked eye are treated for the first time. Particle measurement, size distributions, packaging arrangements, physical properties, and industrial applications are fully discussed. D. stresses the fundamental aspects of particle measurement and physical and chemical behavior. Symbols used are mainly those of the American Standards Assn. Material is provided that is invaluable in the analysis and control of industrial dust. Results of the author's intensive research in this field are supplemented by other authoritative findings of the most modern type. An extensive bibliography is included. This book is essential in studies of metallurgy, explosives, soils techniques, printing, paints, mining, finishings, industrial hygiene, packaging of foods and powders, and related problems. It is intended especially for practicing engineers and students in the chemical, mechanical, metallurgical, and civil engineering and geological and hydrological fields. The author is well known as a consulting and research engineer, whose contributions to fine-particle technology in industry and public health are outstanding.

PATENT

Abrading apparatus. W. A. ROSENBERGER (Pangborn Corp.). U. S. 2,315,546, April 6, 1943 (Aug. 31, 1936).

Kilns, Furnaces, Fuels, and Combustion

Coal oxidation. WALTER FUCHS, T. S. POLANSKY, AND A. G. SANDHOFF. *Ind. Eng. Chem.*, **35** [3] 343–45 (1943).—By oxidation in three stages, bituminous coal is transformed into furfural-soluble substance with a yield of 90% or more of the coal proper. The furfural solutions may be considered as systems of two completely miscible substances. Methods for the separation of furfural and ash-free carbonaceous material are pointed out, and possible uses are listed. Illustrated. F.G.H.

Combustion principles should be applied when firing downdraft kilns. H. L. LONGENECKER. *Brick & Clay Record*, **102** [3] 26–27 (1943).—The full heat value of coal is obtained only when oxidizing conditions are prevalent in kilns. Coal burned to CO instead of CO_2 produces about 62% of its total B.t.u. content. Ware requiring a reducing atmosphere for a specific color desired can be burned oxidizing to maturity and then flashed for an hour with a reducing flame. CO_2 recorders are useful for governing kiln atmospheres; the portable type may be used for periodic kilns. Adequate flue size is of course essential; 1 in. of stack flue for each foot of kiln diameter is usually desirable. If 50% of the floor openings are covered in setting, the total area of the floor openings should be at least 50% more than the total area of the stack flue. Excessively high drafts require heavy firing, resulting in reducing conditions which produce poor ware. B.C.R.

***Diagram for the mean specific heat of combustion gases of gaseous fuels.** K. BECK. *Wärme*, **65** [24] 213–15 (1942).—A statistically derived diagram gives the average specific heat of waste gases up to 1500°C. as a function of the heating value of the fuel gas and the excess of combustion air. The accuracy is 1 to 2%. M.HA.

Effect of oxidation on reactivity and swelling of Illinois coals. O. W. REES AND W. F. WAGNER. *Ind. Eng. Chem.*, **35** [3] 346–48 (1943).—The effect of oxidation of laboratory samples on the reactivity and British swelling index numbers was studied. Samples were exposed for 8 to 9 months, and tests were made at various intervals. Agglutinating values were determined occasionally to demonstrate that oxidation did take place. Three sets of whole coal and banded ingredients representing high-volatile bituminous ranks A and C were studied. F.G.H.

***Heat transmission in industrial firing installations by carburization.** O. T. KORITNIG. *Wärme*, **65** [31–32] 281–82 (1942).—Means of improving the heat exchange in regenerators and recuperators are discussed, and the improvement of gas radiation by carburizing the flame is investigated in particular; the addition of hydrocarbons makes the flame more luminous. The limitations of this method, dependent on the temperature conditions in the furnace chamber and on the dimension, movement, and shape of the flame, are treated exhaustively. M.HA.

* Obtained from microfilm.

***Method of calculating and designing injector burners.** W. HEILIGENSTAEDT. *Arch. Eisenhüttenwesen*, **15** [12] 529–38 (1942).—Injector burners are those in which either the gas under compression sucks the combustion air or the air under compression sucks the gas along, and both are mixed in the burner. A complete theory is given, and operative methods are described in detail. The correct ratio of gas to air is controlled automatically in a simple manner, as only one valve is required. Formulas are derived for the design of burners for coke-oven gas, producer gas, and blast-furnace gas. M.HA.

Practical aspects of automatic control. W. H. STEINKAMP. *Ind. Heating*, **9** [10] 1301–1308; [11] 1466–72; [12] 1614–22 (1942); **10** [1] 42–49, 82; [2] 180–88; [3] 344–50 (1943).—Practical considerations governing the selection and use of industrial automatic-control instruments, especially for temperature and furnace control, are discusssed in detail with examples. M.HA.

***Steel production in the graphite rod melting furnace by the remelting process.** W. GELLER AND H. HÖNIG. *Stahl & Eisen*, **62** [1] 9–14 (1942).—Graphite rod melting furnaces are usually drum furnaces with one or two heating rods or hearth furnaces with three rods, which are heated by low-voltage alternating current and transmit their heat only by radiation to the charge and the furnace walls. The heating rods consist of electrographite with a specific resistance of 8 to 12 ohm/m./mm.^{2} and require, according to dimensions, 20 to 75 volts maximum with up to 6000 amp. (300 amp./cm.^{2}); the radiated energy is about 100 watts/cm.^{2} surface at a temperature of 2500°C. M.HA.

Stoker firing requires little attention and is dependable in operation. ANON. *Brick & Clay Record*, **102** [3] 19–20 (1943).—In converting its kilns from hand firing to stoker firing, the Belden Brick Co. built continuous bag walls instead of individual walls to ensure better heat distribution; some increase in kiln capacity was also obtained. Results were satisfactory, and further conversion is contemplated. B.C.R.

What's happening inside your kiln? XIII, Kiln drafts. L. R. WHITAKER. *Brick & Clay Record*, **102** [3] 32–34 (1943).—W. discusses the factors affecting kiln draft. Large furnaces and high drafts should be available for proper control over the firing rate. A slightly longer water-smoking period may materially reduce the time necessary in firing at high heat. Adequately sized furnaces are essential for carrying out such a schedule. For Parts **VIII–XII** see *Ceram. Abs.*, **22** [5] 82 (1943). B.C.R.

PATENTS

Gas and oil burner. J. M. RYAN. U. S. 2,315,547, April 6, 1943 (April 10, 1941).

Improving graphite electrodes. J. A. M. W. MITCHELL (Imperial Chemical Industries, Ltd.). U. S. 2,315,346, March 30, 1943 (May 10, 1941).—In methods of making

improved shaped graphite electrodes wherein shaped carbon electrodes are heated to an elevated temperature sufficient to effect graphitization in the presence of contained catalytic amounts of nonvolatile metal oxides such as oxides of aluminum, iron, magnesium, titanium, and vanadium and are subsequently cooled, the improvement which comprises subjecting the electrodes to a chlorine-containing atmosphere during the cooling stage while the electrodes are still at a relatively elevated temperature such that the metallic oxides are converted to chlorides and the chlorides are volatilized.

Kiln-drawing means. V. J. AZBE (Gypsum, Lime and Alabastine, Canada, Ltd.). Can. 411,282, March 23, 1943 (Jan. 24, 1942). G.M.H.

Geology

Bauxite deposit of Bagru Plateau near Loghardaga, Ranchi District, Bihar. H. L. CHHIBBER AND R. C. MISRA. *Trans. Indian Ceram. Soc.*, **1** [3] 177–202 (1942).—The physical features, geology, occurrence, microscopic character, and chemical composition of the deposit are discussed. The history of bauxite mining at Bagru and the communications and rate of transport to and from the deposit are described. P.S.D.

Importance, composition, and analysis of Bolivian tin concentrates. SILVE KALLMANN. *Ind. Eng. Chem., Anal. Ed.*, **15** [3] 166–74 (1943).—The chemical analysis of Bolivian tin concentrates of the cassiterite type is thoroughly discussed. Detailed procedures are given for the following determinations: (1) tin, (2) lead, (3) copper, (4) antimony, (5) arsenic, (6) bismuth, (7) zinc, (8) sulfur, (9) silica, (10) iron, (11) aluminum, (12) titanium, (13) calcium, and (14) magnesium. F.G.H.

Mineralogical study of some Indian glassmaking sands. R. C. MISRA. *Trans. Indian Ceram. Soc.*, **1** [3] 169–74 (1942).—Samples of sand from (1) Bargarh, Banda District, U. P., (2) Loghara, Allahabad District, U. P., (3) Jaijon, Hoshiarpur District, Punjab, and (4) Sawai Madhopur, Jaipur State, Rajputana, were subjected to chemical, mechanical, and microscopical analyses. The major portion of the sands is between 60- and 80-mesh, and the grains are mostly subangular. Tourmaline, hornblende, and hematite are the most conspicuous of the heavy minerals; zircon, diopside, ilmenite, rutile, magnetite, limonite, iron pyrites, and biotite are also present. Coating by iron oxide appeared to be the most important factor in determining the color of the sand, with organic matter and heavy-mineral content next in order of importance. P.S.D.

Obtaining iron-free zircon from Soviet raw materials. A. WAKHS. *Novosti Tekhniki*, **10** [5] 25–26 (1941); abstracted in *Chem. Zentr.*, **1942, I** [16] 2052.—The refining process worked out by W. and E. A. Popelyayeva is based on the treatment of zircon concentrate with H_2SO_4, stirring for 15 min. at 160° to 180°, washing, drying to 90° to 100°, sifting, and heating to redness at 700° to 800° for 1 hr. The final product (yield 93 to 94%) is free from iron and can be used as a complete or partial substitute for SnO_2 or Co in the enamel industry. M.V.C.

Physical properties of the estuarine and marine clays of the Port Elizabeth area. V. L. BOSAZZA. *S. African Jour. Sci.*, **38**, 145–50 (1941).—Size analyses, petrographic examinations, and modulus-of-rupture determinations were made. Much fine but little coarse sand is present. The clays are gypsiferous, and illite is reported for the first time in South Africa. The clays are of quite high quality. They slake easily in water, and the modulus of rupture is high. Illustrated. L.W.V.

Strategic materials from low-grade and complex ores. R. R. SAYERS. *Chem. Industries*, **51** [7] 842–46 (1942).—The work of the U. S. Bureau of Mines in the metallurgical development of low-grade ores is described. The Bureau started the exploration and development of domestic mineral deposits in Aug., 1939. Ore dressing has been the preferred treatment, but new or modified smelting or other reduction processes are employed where necessary. Electrolytic methods for chromium and manganese have been successfully developed. Investigation is now being carried out on the extraction of sufficiently pure alumina from clay for the production of aluminum. The extraction of Mg and Zn is also being investigated. E.D.M.

White mica in Canada. ANON. *Chem. & Ind.*, **62** [9] 88 (1943).—A high-grade white-mica deposit has been discovered in the region 30 miles from North Bay, Ont., Canada. The mica is as pure as that coming from India. R.H.B.

SEPARATE PUBLICATIONS

Action of Some Aqueous Solutions on Clays of the Montmorillonite Group. P. G. NUTTING. *U. S. Geol. Survey Professional Paper*, No. 197-F, 19 pp. Price 10¢.—Most clays are partly soluble in acid and alkaline solutions, but the soluble material varies widely in composition with the strength of the solvent solution. In nearly pure water, silica but very little of the bases is dissolved, whereas in strong acids bases go into solution, but no silica. This investigation covers the solubilities of 6 different clays in acids of 9 concentrations from 0 to 4%. Curves show the proportion of silica dissolved at each concentration and the amount of water-soluble and water-insoluble sesquioxides. Many of these curves show maxima and minima at intermediate concentrations. Their significance is discussed. Many solutions contained silica in excess of saturation, indicating that it is partly in solution as a silicate. Solubility curves for oxalic acid differ widely from those for hydrochloric acid. The solubility of silica in some clays reaches its maximum in acid solutions having concentrations corresponding to saturation with carbon dioxide. Solubilities in solutions of sodium carbonate were investigated by the same method. Maxima occur at much lower concentrations than in the acid solutions. Many solutions were electrodialyzed to gain further insight into their constituents. The results obtained bear directly on many problems of metamorphism in sedimentary rocks and on the decomposition of soils. R.A.H.

Differential Thermal Analysis of Clay Minerals and Other Hydrous Materials. R. E. GRIM AND R. A. ROWLAND. *Illinois State Geol. Survey Rept. Investigation*, No. 85, 34 pp. (1942); *Amer. Mineralogist*, **27**, 746–61, 801–18 (1942).—Differential thermal curves are presented for a large number of clay minerals and related silicates. The characteristics of the thermal curves of illites, kaolinites, montmorillonites, and other clay minerals are discussed. The significance of the thermal data with regard to the lattice structures of the clay minerals and to the changes they undergo when subjected to heat is considered. On the basis of these considerations, certain clay mineral names are discredited. Thermal curves are presented also for natural and artificial mixtures of clay minerals, and the use of differential thermal curves for identifying clay minerals and estimating their relative abundance in conjunction with X-ray, optical, and chemical methods is critically analyzed. G.A.K. + W.D.F.

Rare Alkalis in New England. FRANK L. HESS, ROSCOE J. WHITNEY, JOSEPH TREFETHEN, AND MORRIS SLAVIN. *U. S. Bur. Mines Information Circ.*, No. 7232, 51 pp. (1943). Free.—Unusual alkali deposits in the New England region are described, and photographs of outstanding specimens are shown. R.A.H.

Standard Thermal Dehydration Curves of Minerals. P. G. NUTTING. *U. S. Geol. Survey Professional Paper*, No. 197-E, 20 pp. Price 5¢.—The loss of weight with rise of temperature is a well-defined characteristic of many minerals and is frequently useful in their identification. From several hundred curves representing such change obtained during the last 15 years by an improved method, 73 type curves have been selected and reproduced in 9

groups for convenient reference. These groups include isotropic oxides and silicates, hydrated oxides, zeolites and other hydrous silicates, kaolins, montmorillonites, chlorites, micas, carbonates, and hydrous carbonates. Each mineral is briefly described, attention being called to similarities and differences between its curve and others of the same group, and significant features are discussed. R.A.H.

Chemistry and Physics

Determination of ferrous iron in difficultly soluble materials. GILBERT E. SEIL. *Ind. Eng. Chem., Anal. Ed.*, **15** [3] 189–92 (1943).—S. indirectly determines the ferrous iron in chrome ore by titrating the sulfur dioxide liberated when sulfuric acid oxidizes the ferrous oxide content of the ore. Illustrated. F.G.H.

Effect of potassium salts on aluminum oxychloride hydrosol. M. W. KELLY AND K. S. ROSTLER. *Jour. Phys. Chem.*, **46**, 317–25 (1942).—Aluminum chloride hydrosol was aged at room temperature and at 80° to 85°C., and the effect on the pH was measured. At room temperature no change was noticed on aging for two months, but at the higher temperature the acidity increased rapidly in the first few hours and much more slowly thereafter. The effect of solutions of KCl, K_2SO_4, and of ten organic salts of potassium (all adjusted to about pH 6) was also studied, and the salts are arranged in the order of relative effectiveness in raising the pH of the sol. The results are explained in terms of the Thomas theory of the structure of colloidal particles of "oxide" hydrosols. R.A.G.

Electrochemical properties of mineral membranes: III, Estimation of ammonium ion activities. C. E. MARSHALL AND W. E. BERGMAN. *Jour. Phys. Chem.*, **46**, 325–27 (1942).—A clay membrane can be used to measure ammonium ion activities below 0.1 *N* by a method similar to that described for potassium ion activities in Parts I and II. The pH should be greater than 4, ammonium should be the only monovalent cation present, and the concentration of divalent ions present should be less than that of ammonium. **IV, Measurement of ammonium ion activities in colloidal clays.** *Ibid.*, pp. 327–34.—Titration curves are given for several clays. Ammonium salts of weak acids or of high initial pH lose ammonium ions to the clay in a manner similar to ammonium hydroxide. The presence of polyvalent clay ions does not affect the activity of ammonium ions from ammonium chloride over the range studied. For Part I see *Ceram. Abs.*, **21** [11] 247 (1942). R.A.G.

Graphical interconversions for multicomponent systems. JOHN D. LESLIE. *Ind. Eng. Chem.*, **35** [4] 495–96 (1943).—The method of Sun and Silverman for the interconversions of weight, volume, and molar compositions in binary systems (*Ceram. Abs.*, **21** [9] 201 (1942)) has been extended to multiple systems. This should increase the usefulness of the method considerably. Illustrated. F.G.H.

Interconversions of polycomponent compositions by graphical methods. KUAN-HAN SUN AND ALEXANDER SILVERMAN. *Ind. Eng. Chem.*, **35** [4] 497–99 (1943).—Simple graphical methods are proposed for the interconversion of weight, volume, and mole fractions and for conversion into these fractions from compositions expressed in parts by weight or volume or as number of moles in a polycomponent system. Illustrated. F.G.H.

New selective reagent for lithium. Application to the rapid volumetric estimation of lithium in the presence of potassium and sodium. LOCKHART B. ROGERS AND EARLE R. CALEY. *Ind. Eng. Chem., Anal. Ed.*, **15** [3] 209–11 (1943).—Lithium is quantitatively precipitated as a complex periodate by a strongly alkaline potassium periodate solution. Such a solution may be made the basis of selective methods for the detection or determination of lithium, as with proper adjustment of alkalinity the other alkali metals do not form insoluble periodates. By systematic experiments with a series of trial reagents it was found that a reagent of the following composition gave the best results: potassium hydroxide 24 gm., potassium metaperiodate 10 gm., and water 100 ml. F.G.H.

Nuclear structure of the elements. LAURENCE H. SENSICLE. *Chem. & Ind.*, **62** [6] 55 (1943).—S. comments on his theory of nuclear structure based on tetrahedra joined together by face-to-face joins and edge joins. R.H.B.

Quick analysis of clays and grog products. A. I. SHARPSTEĬN AND A. K. DIAKONENKO. *Zavodskaya Lab.*, **9**, 1227–32 (1940); abstracted in *Chem. Zentr.*, **1942**, I [21] 2694; *Khim. Referat. Zhur.*, **4** [6] 76 (1941).—The following procedure has been worked out for a rapid analysis of clays and grog products for Al_2O_3, TiO_2, and Fe_2O_3. Fuse a sample with NaOH in a silver crucible. Leach the fused mass with water and allow to settle. Filter an aliquot, acidify the filtrate with HCl, add a solution of hydroxyquinoline in an amount sufficient for the maximum content of Al_2O_3, and then add a solution of CH_3COONa. After some time heat the solution until it becomes cloudy, make to a definite volume, filter and titrate the excess hydroxyquinoline in an aliquot with a solution of bromide-bromate, adding this reagent in some excess, and titrate back iodometrically. Thus determine Al_2O_3. Filter the remainder of the master solution through the same filter which was used for the solution of Al_2O_3. Dissolve Ti and Fe oxides with HCl. Determine Fe and Ti in aliquots. As the colorimetric determination of Ti in a HCl solution and in the presence of Fe is not reliable, reprecipitate Ti and Fe with NH_4OH and dissolve the precipitate on the filter with H_2SO_4. Determine TiO_2 in this solution colorimetrically. As Fe does not settle out completely, add the alkaline filtrate to the solution obtained by dissolving the hydroxides. Determine Fe_2O_3 by the Zimmerman-Reinhardt method. The deviation in the values of results obtained by this method from those obtained by the classical method is from -0.48 to $+0.57\%$ absolute for Al_2O_3, and from -0.24 to $+0.27\%$ absolute for Fe_2O_3. Ten analyses can be made within 3.5 hr. An analyst with an assistant can make 450 to 500 analyses per month. M.V.C. + M.Ho.

Strontium carbonate. Conversion from strontium sulfate by metathesis with alkali carbonate solution. KENNETH A. KOBE AND NORMAN J. DEIGLMEIER. *Ind. Eng. Chem.*, **35** [3] 323–26 (1943).—The optimum conditions for the conversion of strontium sulfate to the carbonate by the action of solutions of alkali carbonates were determined. The operation of a pilot plant for the chemical beneficiation of a mixed strontium sulfate-carbonate ore is described. Illustrated. F.G.H.

X-ray studies on the hydrous oxides: X, Anatase and rutile modifications of titania. H. B. WEISER, W. O. MILLIGAN, AND E. L. COOK. *Jour. Phys. Chem.*, **45**, 1227–34 (1941).—Titania precipitated by hydrolysis is in the form of the more soluble and less stable anatase crystals which dissolve and reprecipitate as the less soluble and more stable rutile modification. This process is retarded by an adsorbed layer of ions on the anatase and accelerated by an ionic environment in which anatase is more soluble. Anatase formed from titanium chloride or nitrate is transformed fairly rapidly into rutile at 100°C. This is retarded by a large excess of alkali or chloride or nitrate ions but is speeded up in the presence of excess hydrochloric or nitric acid because of the increased solubility of the anatase in spite of the protective action of the adsorbed ions. Sulfate ions are adsorbed much more strongly, and anatase formed from titanium sulfate solutions is only very slowly transformed into rutile even in strong sulfuric acid solutions. See "Electron. . .," *Ceram. Abs.*, **20** [8] 204 (1941). R.A.G.

PATENTS

Ceramic stenciling ink and vehicle therefor. FREDERICK SHURLEY (Guthrie Ceramic Labelling & Machinery Co., Inc.). U. S. 2,318,124, May 4, 1943 (June 30, 1939).—

A nonoily, resinous, air-drying vehicle for vitrifiable stenciling inks used for ceramic printing which consists of a mixture containing a liquid oleoresin, copaiba resin, molasses, and a small amount of a liquid dialkyl phthalate ester in proportions producing a thin liquid vehicle in the general proportions of more than one-half being copaiba resin, one-half thereof being liquid oleoresin, about a fifth of the latter being molasses, and less than 1% being dialkyl phthalate, the vehicle, when mixed with ceramic coloring material, forming a stenciling ink capable of adhering to a glass or metal surface and drying without the application of heat, thereby enabling colors to be superimposed to form a multicolored design which can be fired in one operation.

Manufacture of barium carbonate. I. E. WEBER AND W. S. WOOD. U. S. 2,315,472, March 30, 1943 (Jan. 12, 1940).—In the manufacture of barium carbonate comprising the production of an aqueous solution of an alkali salt of carbonic acid and interaction of the solution with an aqueous solution of a barium salt of hydrosulfuric acid, the step which consists in treating the aqueous solution of the alkali salt of carbonic acid with a water-soluble sulfide and removing insoluble matter from the solution before interaction with the barium salt of hydrosulfuric acid.

Preparation of rutile titanium dioxide. S. S. COLE (National Lead Co.). U. S. 2,316,840, April 20, 1943 (Aug. 7, 1939; Jan. 19, 1940).—A method of preparing a pigmentary composition containing rutile titanium dioxide which comprises forming an intimate and uniform mixture of anatase titanium-oxygen compounds and a small amount of an inorganic compound capable of forming by reaction with titanium dioxide a compound having crystalline characteristics classifiable within the sodium chloride crystallographic group which does not decompose and is nonliquefiable and nonvolatile at the temperature of the subsequent heat-treatment in an amount between about 0.5 and 5.0% calculated on the titanium dioxide, TiO_2, content of the mixture and heating the mixture at temperatures at which as indicated by an X-ray examination anatase titanium-oxygen compounds are converted to rutile titanium dioxide until such conversion takes place. **U. S. 2,316,841**, April 20, 1943 (Aug. 7, 1939; Jan. 19, 1940).—A method of preparing a pigmentary composition containing rutile titanium dioxide which comprises forming an intimate and uniform mixture of anatase titanium-oxygen compounds and a small amount of an inorganic compound having crystalline characteristics classifiable within the phenacite crystallographic group which does not decompose and is nonliquefiable and nonvolatile at the temperature of the subsequent heat-treatment in an amount between about 0.5 and 5.0% calculated on the titanium dioxide, TiO_2, content of the mixture and heating the mixture at temperatures at which as indicated by an X-ray examination anatase titanium-oxygen compounds are converted to rutile titanium dioxide until such conversion takes place.

Silica gel manufacture. H. F. DARE AND ALBERT MILLIEN (Anglo-Iranian Oil Co., Ltd.). Can. 411,235, March 23, 1943 (Jan. 16, 1940). G.M.H.

General

Bureau of Mines electrodevelopment laboratory. ANON. *Bull. Amer. Ceram. Soc.*, **22** [5] 165 (1943).

Foreman's place in the safety program. H. W. HEINRICH. *Better Enameling*, **14** [2] 2–5 (1943).—The reluctance of foremen to accept responsibility for the safety of their men is generally due to the fact that they have not been adequately informed as to how the job should be done. Success in obtaining obedience to safety regulations by the employees depends largely on the executive skill of the foreman. Complaints concerning the unsatisfactoriness of safety apparel should be carefully investigated, and the faults should be corrected. Frequent violations of safety rules usually occur prior to an accident, and they should be detected before disaster comes. Foremen often do not know how strongly safety should be stressed at the expense of production, not realizing that the best and the most production can be obtained only when the job is done safely. B.C.R.

Free industrial enterprise challenge: will ceramic industries be prepared for continuity of change? G. H. MCINTYRE. *Bull. Amer. Ceram. Soc.*, **22** [5] 153–55 (1943).

Reduction of iron ores in clay plants. CLARENCE AUSTIN. *Brick & Clay Record*, **102** [3] 17–18 (1943).—Iron ore fines cannot be fed to the blast furnace because of their tendency to be blown out by the blast. In some cases the fines are treated in a sintering machine at a cost of 70¢ per ton; in others they are rejected as waste material, often representing huge accumulations. Rotary kilns are not entirely suitable for sintering, as too large a proportion of fines remains. By mixing the fines with coal in small, round, covered saggers and heating to 1900° to 2000°F., the ore is reduced; either a cokelike mass or a strongly sintered shape results, which can replace the scrap charged to the open hearth. B.C.R.

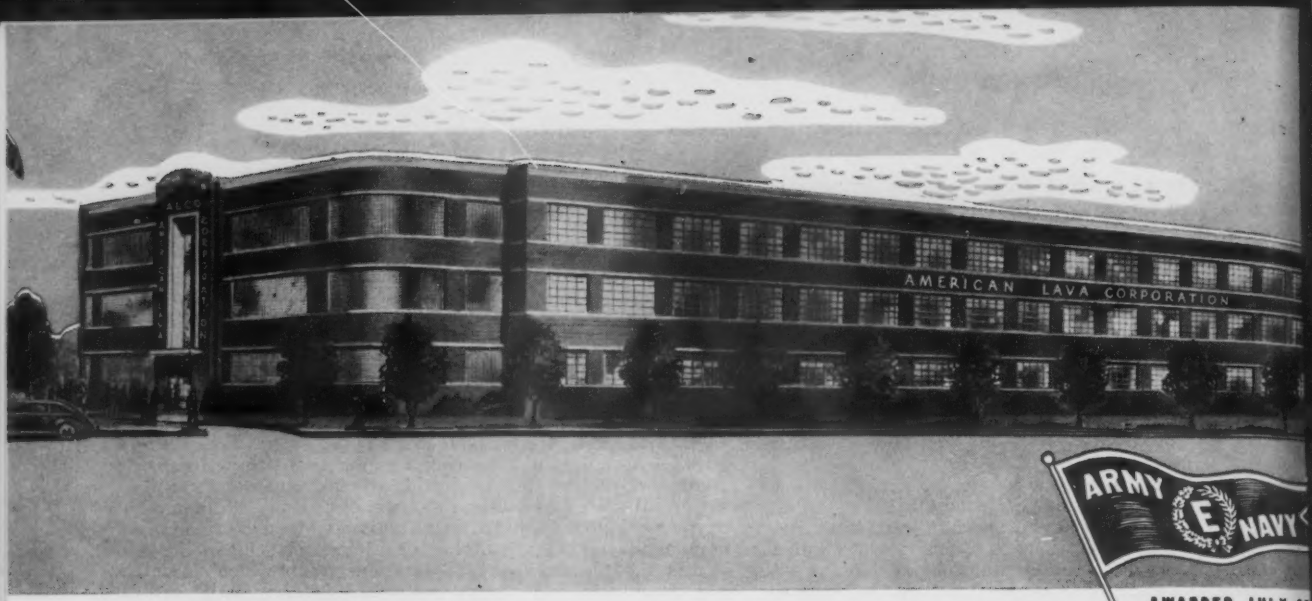
Removal of iron from water. Use of carbonaceous ion exchangers. F. K. LINDSAY. *Ind. Eng. Chem.*, **35** [3] 378–80 (1943).—The presence of iron compounds in many water supplies presents a problem comparable in importance to that of hardness-forming constituents, the salts of calcium and magnesium. The application of a typical carbonaceous ion exchanger to the removal of iron from public water supplies is discussed. The mechanism of iron removal is explained. Comparative capacity data covering the removal of iron, calcium, and magnesium from pure solutions are given, together with tables on the effect of varying concentrations of iron on the capacity of the exchanger for its removal. Data on the influence of varying concentrations of calcium and magnesium salts on the capacity of the exchanger for iron removal are also given. Examples are cited illustrating industrial and domestic applications of the carbonaceous exchangers. F.G.H.

Woman vs. man factory worker. ANON. *Bull. Amer. Ceram. Soc.*, **22** [5] 164 (1943).

BOOKS

Industrial Chemistry. 4th ed. EMIL R. RIEGEL. Reinhold Publishing Corp., New York, 1942. 86 pp. Price $5.50. Reviewed in *Chem. & Eng. News*, **21** [3] 195–96 (1943).—Chapters on the following subjects are included in this volume: (1) Portland cement, lime, and gypsum plaster; (2) ceramic industries, including the production of whiteware, building brick, refractory brick and crucibles, and vitreous enamels; (3) structural glass, glass containers, optical glass, and special glasses; (4) fuels of all types; and (5) products of the electrothermal furnace, including graphite, silicon carbide, aluminum oxide, and boron carbide. F.G.H.

Industrial Research. F. RUSSELL BICHOWSKY. Chemical Publishing Co., Inc., New York. 126 pp. Price $2.50. Reviewed in *Chem. Industries*, **52** [2] 241 (1943).—The social importance of research is discussed, and the general principles of organization and management which have proved to be successful in the laboratory are outlined. E.D.M.



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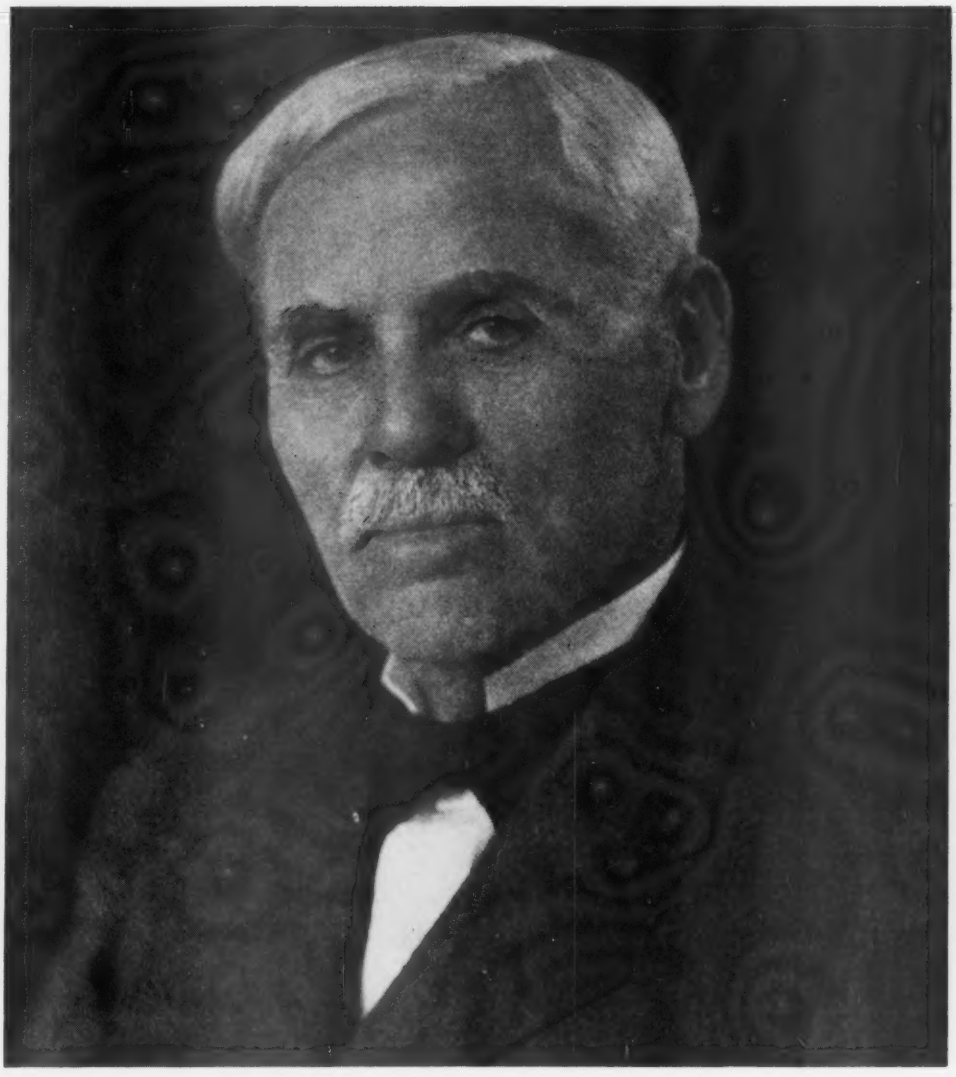
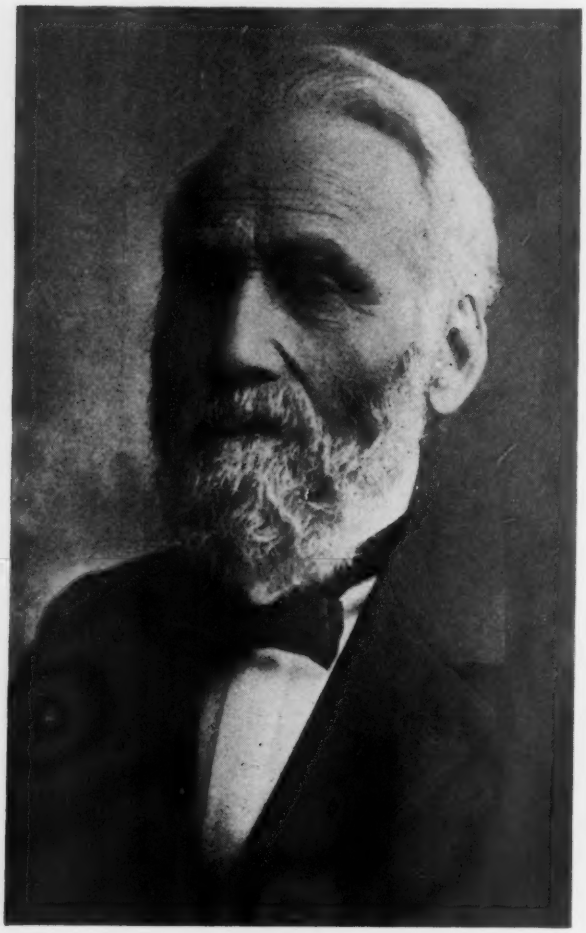


LEONARD L. DENISON

THE DENISON FAMILY

Structural Tile and Brick

In 1871, Wesley Denison moved from his farm in Licking County, Ohio, to a farm on the western edge of Delaware, Ohio, so that his four sons might have the educational advantages offered by the Ohio Wesleyan University located there. Although all of his sons attended the College, owing to financial conditions only the oldest son, Louis B. Denison, was able to graduate. He became a civil engineer, later entered the bridge-building business, and followed this occupation throughout his life.



Wesley Denison

Leonard L. Denison

The second son, Leonard L. Denison, taught school after leaving college, and then joined his father in raising broom corn on the home farm and making it up into brooms for sale. He was able to accumulate $700 after several seasons of this type of work. This $700 was to be the financial basis for a clay products manufacturing industry which grew and prospered through several generations to the present day.

Their First Drain-Tile Plant

Northwestern Ohio lands were at that time greatly in need of drainage. The use of tile for this purpose was in its infancy. Realizing the opportunity presented in the manufacture of drainage tile, Leonard Denison visited factories already in operation, observed processes employed, and then convinced his father that they should start into business on the rear of their farm, where common clay suitable for tile manufacture was to be had for the digging. They had a team of horses and a wagon, the $700 in cash, and a full realization of the hard work which would be necessary on their part to put the new venture across. The money would be required to buy machinery and firebrick; all else they must provide with their own hands. In the fall of 1877, they decided to embark on the enterprise.

Leonard Denison obtained permission from the owner of some standing timber to cut what trees were required for lumber for the new factory. Payment was to be made in drain tile later. They felled the trees, and, with the first snow, sledded the logs to a nearby sawmill to have the lumber necessary for the building sawed out. Wesley Denison hand-rived the shingles for the roof. Nails and hardware were obtained from a Delaware hardware store which also handled farm drain tile. They agreed to pay their bill in drain tile later on.

They then built the factory building, which consisted of a one-story dry shed, twenty feet wide by one hundred and nine feet long, with slatted wooden racks on both sides, and a track with wooden rails running the length of the shed and over which a car was pushed to convey the newly molded tile from the molding machine to the drying racks. The kiln, located at the end of the shed, was rectangular in shape, twelve by twenty-six feet inside, and with a square brick stack at one end. The thrust of the crown was held by heavy wooden timbers, sixteen inches square, framed around the kiln with provision to adjust for expansion of the heating crown by driving large wooden wedges in and out of the frame. The kiln was fired with wood through three fireholes at each of its ends.

Their tile machine cost $250 and was purchased from P. LaTourrette, who operated the Marion Iron Works at Marion, Ohio. It was a vertical machine operated by horsepower, with the two horses pulling a heavy boom fastened at the top of the machine. As the horses went around, the machine would thrust out tile from one side, on the board-delivery principle, and then repeat the operation on the opposite side. Usually two sizes of tile were made at the same time, one on each side of the machine. Clay was dug and hauled by team to a soak pit near the machine, whence it was spaded up into the tile machine as it operated.

Three men operated the plant, each taking his turn at off-bearing the tile from the mill when molding was going on, setting and drawing the tile, and firing the kiln at night.

Although the factory was but a "summer plant,"

capable of drying only during the warm weather, several kilns of tile were produced in that first season of 1878. As soon as the season was ended that year, they built another dry shed, eighty-two feet long and, like the first one, at the other end of the mill. In 1881, steam power

William C. Denison (1908)

was installed, and a third dry shed was built alongside the first shed. A siding was laid and connected with the adjacent railroad for carlot shipping. With these improvements, the seasons of 1881, 1882, and 1883 yielded more and better tile. Sizes of tile produced ranged from two and one half to eight inches, inclusive.

W. C. Denison Joins Leonard in a Second Plant

Under-draining by the use of clay tile had by this time become so generally adopted that it was found expedient to plan for manufacturing even larger sizes of tile than the little plant could produce. This, however, would require a new works capable of all-year operation. Wesley Denison, owing to his age, declined to join in such a venture. So Leonard took his youngest brother, W. C. Denison, in with him in the spring of 1884. They formed a partnership and went to Mt. Gilead, Ohio, where they bought a pottery and drain-tile plant. They planned to enlarge it to a factory which would produce tile up to

J. F. Denison

(Reading from left to right): L. B. Denison, L. L. Denison, J. F. Denison, W. C. Denison. Photo taken July 4, 1924.

and including eighteen inches inside diameter. It soon became apparent that it would be better to dispense with the old pottery factory entirely and construct a new works. This they proceeded to do. The new factory was located on the Big Four and T. & O. C. Railways, about halfway between Mt. Gilead and Edison. The building was thirty-two by ninety feet. Two kilns with twenty and one-half feet inside diameters were housed in a shed at one end of the building. The remainder of the building, two stories high, joined the kiln shed. Engine, boiler, and tile machine were located in the basement, and tile was conveyed to slatted dry floors above on a power elevator. A side track from the railroad served the plant.

L. L. Denison devoted his time primarily to manufacturing, and W. C. Denison took over the sales and office work. They made a success of the Mt. Gilead plant and operated there from 1884 to 1890. Then, again, the demand for the larger sizes of drain tile, the limited capacity of the Mt. Gilead works, and the dwindling clay deposit there caused them to seek a larger plant elsewhere.

J. F. Denison Joins Leonard and William in the Third Plant

They acquired a large stone building located on East William Street in Delaware, Ohio, which once had been a foundry and later a wagon works. They remodeled it into a tile plant by installing wooden slatted floors for drying, dry and wet pans, a steam press, and eight round kilns. Transferring their activities to the Delaware plant, they invited their brother, J. F. Denison, to join the Company in a sales capacity. He accepted, and the plant operated at full production the year round to meet the evergrowing demand for farm drain tile.

On March 7, 1892, the Company was incorporated under the name of The Delaware Clay Manufacturing Company. That organization continues to operate today with a slight change in name to The Delaware Clay Company.

In the 1890's, the modern "skyscraper" had its inception, made possible largely by the use of hollow-tile fireproofing. This type of building construction opened a vast market to those manufacturers of clay products who were equipped to enter it. The Denison Brothers were not slow to appreciate the opportunity. They began immediately to manufacture all shapes and sizes of flat-arch and partition tile and became pioneers in this product. They not only furnished tile for large buildings throughout the Middle West and East, but also took contracts for fireproofing set in place in the buildings. This required a large force of tile-setters and much elevating and form equipment. Numerous office buildings, hotels, and other structures standing today bear witness to the success of this enterprise as carried on by the company.

Hollow Brick Wall Devised

In the late nineties, the Company introduced the first hollow wall material for backing up outside brick walls. This came about in the form of a by-product from its fireproofing activities. In firing large-sized arch tile, it was found desirable to set the bottoms of the kilns with some other product to avoid cracking and over-firing of the arch material. They conceived the idea of making a brick-sized shape with two square holes running through it lengthwise to provide insulation for outside brick walls. They started manufacture, placing the brick shapes in the bottoms of the kilns below the arch settings. When a carload or more of this hollow brick had been accumulated, W. C. Denison, who usually sold the fireproofing jobs and superintended the setting of tile, would persuade the architect to use hollow brick as lining. This hollow brick appealed to farsighted architects and builders, and it became apparent that a future lay ahead for the shape if it were produced cheaply enough to withstand competition with locally produced common brick.

The Fourth Plant Was Built

Accordingly, L. L. Denison, who devoted his activities to the manufacturing end of the business, set about to design a type of brick plant that could turn out this new brick economically. He devised an endless chain drier, with trays hung upon it and holding a day's run of the brick. The trays passed over a sixteen-chamber full-continuous rectangular kiln where the brick were dried by waste heat from the cooling chambers of the kiln below. The brick were molded through a four-stream die on an especially designed horizontal steam press and were end-cut by a hand cutter. This plant was erected in 1901, about half a mile southeast of the old East William Street plant and was in operation by the fall of that year. Its success was immediately assured, and it is still in operation. Thus it may be seen that the Denison brothers were responsible for the initial movement to introduce a hollow brick wall in general building construction. This may be regarded as probably their most outstanding contribution to the industry.

They produced the first large-sized hollow brick units, foreseeing a future in such because of their saving in cost of handling and laying up and mortar. The first evolution from the standard-sized hollow brick was the "giant" or "jumbo" hollow brick, made four by five by eight inches with four cells through it lengthwise; then came the four- by five- by twelve-inch brick so universally produced today; then the five- by eight- by twelve-inch; and finally the so-called "double-common" brick with vertical voids, which displaced two common brick plus their mortar joint. This latter shape was adopted by brick manufacturers generally, even to modern glazed units.

During the winter of 1902, the East William Street plant of the Company, in Delaware, which was devoted to the manufacture of fireproofing block and drain tile, was sold to the National Fireproofing Corporation, of Pittsburgh, Pennsylvania. The drain-tile business was not sold in this transaction and a three-story modern plant was added to the new brick plant which had been erected the year before, just southeast of Delaware. Thus the Company was now set up to manufacture and sell a complete line of hollow brick, hollow building tile, and drain tile.

A Cleveland Plant Was Acquired

In 1904, the three brothers' interests began to separate. They learned that a brick plant, near Newburgh, in southeast Cleveland, was to be sold. As a large market for their hollow brick existed in the Cleveland area, the acquisition of this plant seemed to offer an excellent opportunity to further their business. A separate organiza-

tion, the Ohio Clay Company, was formed by them, the plant was purchased, and W. C. Denison moved to Cleveland to take over its management. By 1911, the brothers' interests had become definitely divided through the exchange, purchase, and sale of their individual holdings among themselves. William C. Denison acquired the Cleveland plant. L. L. Denison and his family purchased the holdings of his brother J. F. and thereby obtained full ownership of the Delaware plant.

William C. Denison (1943)

J. F. Denison Plant in Coffeyville, Kansas

J. F. Denison, with the proceeds from the sale of his holdings, purchased a plant in Coffeyville, Kansas, moved his family there, and entered the clay products business. He was joined in this venture by his sons, John H. and Frank F. They manufactured a line of hollow brick, building tile, and drain tile similar to the line produced at Delaware. Their location was favorable from the standpoint of clay material, natural gas, and market, and their Denison Clay Company prospered. They purchased and used the first shale planer manufactured for sale and later acquired a second plant near Pittsburg, Kansas, which they reorganized as the Western Clay Company. In 1926, both of their plants were sold to the United Clay Products Company. J. F. Denison retired shortly thereafter and died in January, 1939; his sons had already transferred their activities to other fields.

L. L. Denison was joined in his business at Delaware by his two sons, Lonnis and Charles, who have continued to operate that Company successfully since the death of their father in 1937.

William C. Denison's two sons, George W. and Leonard A., entered into the business with him at Cleveland, Ohio. It was at their plant that the first tunnel kiln for the firing of hollow building tile was pioneered and

George W. Denison

(1943)

Lonnis Denison

Charles W. Denison

built, together with continuous tunnel operation. Here, too, William C. invented the well-known Denison Interlocking Tile, a "T"-shaped hollow building tile with unusual interlocking, insulating, and load-bearing qualities. These features, plus the fact that the tile was fast-laying and presented no continuous mortar joint to carry moisture, caused it to become quite popular, and many plants throughout the United States were licensed for its manufacture. As the only surviving member of the three brothers, William C. Denison today resides at Cleveland, where his sons, George and Leonard, are the active heads of the Ohio Clay Company.

Denison Engineering Company

William C. Denison's third son, William C., Jr., entered into the manufacture of hydraulic machinery and equipment for the ceramic industry shortly after World War I. The Denison Engineering Company, at Columbus, Ohio, of which he is president, has enjoyed a steady growth since 1925 in its field of oil-hydraulic equipment, both large and small, for various industrial applications. Today the Company is engaged 100 per cent in war production, and its

William C. Denison, Jr.

products include aircraft testing and ordnance equipment, oil-hydraulically operated standard and special presses for war industries, and other especially designed and hydraulically powered and controlled precision machinery. Pumps, fluid motors, valves, and complete hydraulic systems are among its products, and the Budd Ranney Bar Nut Machine for the automatic production of nut blanks from bar stock is well known both here and abroad.

THE PRESIDENT'S ADDRESS*

By Louis J. Trostel

Just ten years ago, we gathered here in Pittsburgh for our Thirty-Fifth Annual Meeting. From all outward appearances, our environment is unchanged. We are all aware, however, that we are engaged in a war of unprecedented proportions. Few individuals or organizations have escaped its influence. None of us can escape its obligations, and The American Ceramic Society is no exception.

It accordingly is important at this time to note how well we are fulfilling our responsibilities to the war effort, to examine our position as the result of the impact of the war, and to plot our course for the future to the extent that this is possible.

The character of our Annual Meeting program of last year, which was devoted to "War Emergency Problems," and our "War Congress" of this year reflects the attention we have concentrated on the task of implementing the objectives of our armed forces and on ways and means of adjusting our particular industry economy to the severe dislocations resulting from the war. In these Annual Meeting programs, we have been confronted with problems involving acceleration in research and production, conversion in processes and products, and shortages in man power and materials. Pyramided on these problems has

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been an imposing list of government controls affecting every move. It has been part of the policy of The Society to be deeply interested in all of these problems and to lend its support where possible to those involved.

The war activities of The Society proper have been supplemented by the individual services of many of our members. Some are serving in a professional or business capacity in various civilian war agencies; others are serving directly with the armed forces. As a tribute to the latter we instituted the plan this year of carrying them on the rolls of The Society for the duration on an inactive list. While on this list the members will be exempt from the payment of dues; their names will be published regularly in the Membership Roster; and they will waive the right to receive Society publications and the privilege of voting. That these members, however, as well as other interested servicemen, may maintain contact with the ceramic literature against the day when they will again resume their normal activities in plants and laboratories, we have been mailing our publications gratis to thirty-eight post libraries where engineering regiments are stationed.

The Society has weathered this past year of conflict fairly well. A number of well-attended autumn Division meetings were held on schedule. A weak spot, however, developed in the functioning of some of the Local Sections. This was due to difficulties arising from the curtailment of local transportation facilities and not from lack of interest. It was gratifying to note no slackening of interest in the Student Branches in spite of the diversion of student interest due to imminent enlistment. In fact, a new Student Branch was chartered this year at the University of Texas. Next year, however, the Student Branches are likely to be faced with a critical situation as the number of students who will be permitted to attend the universities will be greatly limited because of the war training programs.

Our publications, in spite of increased printing costs and accepted handicaps imposed by government regulations, appeared regularly and maintained their usual high standards. A special undertaking now nearing completion is the comprehensive Bibliography initiated by the Enamel Division.

The financial position of The Society is sound. Expenditures were kept within budgetary requirements, although we encountered some loss in income. Thus the amount of money added to our reserve fund was smaller than usual. A continuation of this trend may be expected if the war continues. This may force us eventually to circumscribe certain of our activities, but not, we hope, to abandon any of them.

We appointed several special committees this year, one on the employment of an Associate Secretary, one on the war status of ceramists, and another on the matter of non-member registration fees. The activities of these special committees, as well as our regular standing committees, are to be commended, particularly as the men on these committees represent a group who have been called upon to carry an extra war load in their own organizations.

Much credit is due to our Membership Committee and to the Secretary's office for their well-studied plans and success in adding to the membership. This materially aided in offsetting losses of foreign membership and subscriptions. A matter in this connection to which The Society has given some serious thought is the extension of corporation membership. With the proper appeal, numerous ceramic and allied corporations not now on our rolls might be convinced that their generosity would aid in the perpetuation, growth, and development of The Society. Our influence in sustaining ceramic technological progress, we choose to think, has contributed toward making these various corporations profitable enterprises. Without the insurance of constant research, we know few of the industries of today would be here; without the insurance of continuing technical societies to stimulate the exchange of research ideas, we know that few of the profitable industries of today would be here tomorrow.

The Society appreciates the efficient manner in which the Secretary and his staff have conducted our affairs during the past year, in spite of loss of personnel and an increasing load of responsibilities.

With an eye toward relieving this load, the Trustees have undertaken the employment of an Associate Secretary. This new position, we hope, will make available to us the services of a man who can devote himself to the development of numerous latent potentialities in The Society. It has always been a source of regret, for instance, that the Student Branches particularly have not had the benefit of more personal contact with the national officers. It is here in the Student Branch meetings where we prepare our young men for their professional life; here is where interest in The Society is nurtured; and here is where we should look for our future leaders. An Associate Secretary could carry on this work, supplement other duties now being performed, and relieve the Secretary to devote more of his time to the broad administrative problems for which his long experience peculiarly fits him. The efficiency and further growth of The Society we believe will thereby be expedited.

During the past year we have been greatly concerned with the conservation of ceramic man power for essential industries. It is not my intention to discuss the details of our considerable activities in this connection, but rather to point out a condition with which we were confronted. This seems to have more serious overtones. In none of the occupational bulletins to the draft boards, including even the one pointing out the essential character of the ceramic industry, nor in the approved engineering courses of the Army Training Program, did we find direct mention of the ceramic engineer or technologist. True enough, we have had interpretations that we could come in under the guise of mineral technologists or certain types of other engineers.

To us, at least, this oversight seems decidedly anachronistic. After all, nearly fifty years have elapsed since Edward Orton, Jr., established the first department for instruction in ceramic engineering.

Before the advent of the ceramic engineer and technologist, our industry was one in which the practical art far outdistanced science. Emergence from that period has been slow, for the roots of certain phases of the industry extend back to antiquity. This resulted for many years in a certain complacency with things as they were. That period is past, and American ceramic products today represent the highest technical perfection in the world. Why

then, at this belated date, does the professional ceramist still lack proper recognition?

For one thing, there is still a lack of understanding in the public mind of the modern concept of ceramics. There are numerous people who do not realize that it is a highly diversified and industrialized process industry, serviced by a trained engineering and scientific personnel. Our early experiences with the E.C.P.D. indicated that up to that time we had failed to entirely impress ourselves upon even other engineering groups. An outsider looking in on this Society and witnessing our efforts to find a proper sphere of operation for the Art Division must be confused. He more likely would expect The Society to be troubled to find a proper sphere of operation for, say, the Refractories Division.

Part of our trouble has been the length of time it has taken to develop a professional consciousness amongst ourselves. The Society in late years has corrected this phase of the situation by providing such professional organizations as the Fellows and the Institute of Ceramic Engineers. These organizations have successfully encouraged a much-needed self-examination and have established professional yardsticks of achievement. They have gone even further toward the solution of the problem. The Fellows through the system of the Orton lectures and the Institute through contacts with the E.C.P.D. and other agencies have introduced the true stature of the ceramic scientist and engineer to allied professions.

Of late there have been some expressions of thought that our problem is due to a lack of crystallization in the minds of the profession itself regarding its objectives. What we are witnessing, of course, is a process of evolution. Ceramics was known first and best as art. At the moment, it is predominantly engineering. Now some of us are adjusting ourselves to the idea that it also includes a thorough understanding of the physical sciences. Eventually, it will be a harmonious welding of all these things. The invasion of the physicist and physical chemist into our ranks is a healthy sign of growth. There is an increasing call from industry, as some of our recent surveys have shown, for men better prepared in the fundamental sciences. The Ceramic Educational Council has concerned itself in the past few years with improvements in university curricula along just such lines. The constitution of the membership of The Society is also a reflection of these trends. Our organization fortunately has so far been broad enough and flexible enough to accommodate itself to these changing conceptions.

I do not profess to have enumerated all the influences which have caused the oversight of the professional ceramist. I do know that the complete solution to the problem will not be accomplished overnight. The intervention of the war has served to emphasize that there should be no letup in our task to achieve proper recognition of the modern ceramist.

With regard to this general situation and particularly our postwar outlook, I wish to quote some remarks addressed to engineers by C. R. Young, President of the Engineering Institute of Canada. These remarks, which apply equally well to the professional ceramist, were as follows:

"The place of the engineer in the future is largely conditional upon the breadth of his outlook, his interests, and his activities. For one who buttresses his technical competency with a wholesome regard for the interests of his fellows and with constructive labors on their behalf, it is secure. That security is not augmented by a straining after *status* (the italics are mine). More than anything else, it rests upon the individual stature of the engineer himself."

Wars play strange tricks with our economy. Technological advances in certain lines of business in times like these are likely to take long sudden strides. In our own industry we know that numerous glass products, heretofore unknown, are today useful servants in our daily lives and in business. A domestic magnesite industry based on the utilization of sea water has just come into operation. This should permanently free us from a part of former foreign competition. On the other hand, some branches of the industry, if not sufficiently forward-looking, are likely to find themselves technically stalemated at the close of a protracted war. If we are to take a realistic view of the future, we must ask ourselves whether some of the present-day ceramic products and methods of production will fit into the postwar economy. The best insurance against such a contingency is the continued extension of technology to ceramic manufacturing. This Society must continue as one of the chief stimuli for these ends. It must be kept strong and alert and thus prepared to do its part in the period of readjustment which will follow the war.

With the coming year, The Society will undoubtedly encounter new problems. Our responsibilities and sacrifices will increase. This may prove to be a difficult period as the attention of our leaders becomes more devoted to war problems. As of today, we are in good shape to face the future. I have little doubt that under the leadership we have selected for next year The Society will be in a position to continue its place—in peace if that good fortune is to be ours in the near future or in war if we must still carry on.

THE NATIONAL ROSTER AND THE ENGINEER*

By Kirk Miles

I. Introduction

The National Roster of Scientific and Specialized Personnel was formed in July, 1940. The main objective toward which all facilities of the Roster were directed was the recording of the names and qualifications of the professional personnel in the United States in such a manner as to make it possible, in response to a request from the armed forces, Government, or industry, to select the person with the exact combination of abilities and skills desired, for in times of an emergency it is desirable to use every

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possible method of matching the right man to the right job. The Roster has consistently attempted to secure as complete a registration as possible of all qualified professional personnel in the critical fields, i.e., those professional fields in which man-power shortages now exist by virtue of the fact that we are at war.

Experience has shown that demands for personnel to staff new research or industrial establishments may often dislocate in an unfortunate way important current research and educational activities. Keymen from established activities may be called into the new positions merely because those doing the recruiting cannot locate any other men for the new jobs. The work of the Roster has now demonstrated that a wide knowledge of the trained man power of the Nation makes it possible in many cases to plan for the effective staffing of new war enterprises. In literally hundreds of cases this has been accomplished without disrupting current work, as men who might have been selected on the basis of personal knowledge have been allowed to continue in their work because individuals equally quaiified but previously unknown to the appointing agency have been found by consulting the analytical list of the Roster.

II. Placement and Evaluation Section

When a registration blank is received by the Roster, the information it contains is coded and transcribed to punch cards. Then when a request is received for, let us say, a chemical engineer with experience in rubber and a speaking knowledge of Russian, the sorting and tabulating machines are adjusted to pick out the cards of the individuals who meet these qualifications and all of the cards on chemical engineers are run through the machines. After this preliminary sorting, a more complete evaluation is made on the basis of the registration papers to obtain individuals who will exactly meet the requirements. Any agency of the Government, or the armed forces, or any industry engaged in essential activity is free to use the National Roster in attempting to recruit professional personnel. Since the formation of the Roster, nearly 25,000 positions have been filled in this manner. Most of these positions have been in the armed services, in the Federal Government, or in Government-sponsored research work mainly because these agencies have been more familiar with the Roster, as it is a governmental body. Generally speaking, industrial establishments have continued to recruit their professional personnel in the same manner as in the past; recently, however, an increasing number of job requests have been received from industrial establishments.

III. Availability File

To assist in finding men who are available to accept new jobs, the Roster maintains an availability file. We are trying through publicity to prompt anyone who desires to transfer from a less essential to a more essential activity to notify the Roster. All of these names and records are then kept in the availability file and when a job request is received this is the first file which is consulted. In some fields, this availability file is now fairly large.

An agreement has recently been reached with the United States Employment Service whereby any job requests of a professional nature that are received by a local office of the Employment Service, which cannot be filled locally from men who are on file in that office, are immediately sent to the National Roster. The preceding procedures are then utilized and the names of available individuals are sent directly to the industrial establishments which made the request. In every case, negotiations for actual transfer are made by representatives of the War Manpower Commission. The United States Employment Service has also agreed that if an individual registers with one of its local branches as desiring employment and if no suitable local opening currently exists his name and address will be forwarded directly to the National Roster. A Roster registration blank is immediately sent to him and his name is added to the availability file. In this way, the Roster is becoming more and more the central clearing agency for the employment of professional personnel in all activities related to the war effort.

IV. Military Advisory Section

As mentioned before, the primary objective and the main work of the Roster is to effect the proper placement of professional personnel in war-related activities. There are, however, two other functions which it carries on. It advises the Selective Service System on occupational deferments for professional men and it accumulates and analyzes data on the personnel situation in the professional fields.

The Military Advisory Section has for some time been giving advice to the Selective Service Boards concerning the professional qualifications of individuals who are about to be reclassified by the local boards. Any person in a professional field who is about to be reclassified may write or telegraph to the Roster asking it to evaluate his record in line with the essential industry and essential occupation list of the Selective Service System to determine whether or not he should be classified as a necessary man. On the basis of the individual's registration papers and information received from references the Military Advisory Section makes its evaluation. To be classed as a necessary man and thus be eligible for deferment an individual must meet three criteria: (1) he must be engaged in war production or in activities supporting the war effort; (2) he must be in a critical occupation, i.e., there must be a shortage of personnel with his qualifications and training such that if he were removed he could not be replaced; and (3) his removal would cause a loss of effectiveness in the activity in which he is engaged.

In any case in which the Military Advisory Section believes that an individual should be classed as a necessary man it certifies this fact to the national headquarters of the Bureau of Selective Service, which in turn notifies the local draft board. The local boards may use this information in determining whether or not to defer the individual in question. This notification in no way binds the local boards to classify anyone as a necessary man; it only serves to give them information which they might not otherwise be in a position to obtain. In those cases in which the Military Advisory Section does not recommend occupational deferment, or in which a man is inducted anyway, a letter is sent to the Adjutant General's Office in Washington, calling attention to the man's particular qualifications. If the Army, or the Navy, in those cases where an individual is joining the Navy, desires a man with this particular train-

ing for a special assignment, he is usually picked up at the induction center as a result of this notification.

V. Professional Surveys Section

The third section of the Roster, the Professional Surveys Section, is charged with determining the over-all supply of, and demand for, personnel in the various professional fields. This Section was organized as part of the Roster's function to secure the maximum utilization of professional personnel in conjunction with the war effort. As one source of statistical data it has available the Roster registrations. At present, however, these registrations in most fields represent only a sample of that field. For example, although there are now more than 110,000 engineers registered with the Roster, this represents less than 50% of the estimated number of engineers in the country.

Within the Professional Surveys Section there is an educational, an industrial, and a governmental unit. The educational unit has made exhaustive surveys of the teaching facilities and the number of students enrolled in the various curricula in the colleges of the United States. This unit also made the survey which was used by the joint Army, Navy, War Manpower Commission Committee for the selection of colleges to be used in the Army, Navy, and Air Corps training programs. The governmental unit has by means of surveys conducted by the Civil Service Commission obtained data on professional employment and needs within the Federal Government and the armed forces. The industrial unit obtains the same data from industry and is at present processing a survey of professional employment in industrial establishments made for the Roster in March, 1943, by the United States Employment Service to obtain data on present employment, labor needs, and anticipated layoffs in certain professional fields. Returns from nearly 15,000 industrial establishments have already been received. One of the fields in which information was obtained is ceramic engineering (for data, see end of this Section). Information from these three units is then coordinated and gathered together in the form of reports on the personnel situation in various fields. Such a report has been issued in the field of physics and in the broad field of engineering, and a report on the personnel situation in chemistry is under way. The data on which these first reports are based are not as complete as some of the data which we are now gathering, as accurate figures from some sources have been impossible to obtain. Nevertheless, these reports do show the general picture in any one field and they will be brought up to date from time to time as new and more accurate data are obtained. These reports are primarily for use within the War Manpower Commission in guiding their policies and for information within the Government, although they will be circulated outside the Government to a limited extent.

On the basis of information we have gathered for the report on the Personnel Situation in Engineering, we estimate that there are in the United States, exclusive of students who were in school during the academic year 1942–1943, about 280,000 professional engineers. This estimate, naturally, is only approximate as it is impossible to define a professional engineer with the same accuracy that one can define a doctor. About 19% of these engineers are in the armed forces and in the War and Navy Departments, about 12% in other governmental positions, and 49% in manufacturing, mining, and construction. The remaining 20% are employed in transportation, communications, public utilities, private consulting offices, colleges, and universities.

The present situation in which the demand for engineers so greatly exceeds the supply is brought about by an expansion of the ordinary engineering jobs, plus one additional factor, viz., the tremendous need of the armed forces for engineers for operating and maintenance purposes. Either one of these demands without the other could be met without too much trouble, but the two together create a difficult situation. As the war is primarily fought by the Army and the Navy, they naturally must have first choice in the use of engineers with the caution that industry must not be denuded.

The daily emphasis on the engineer's role in our war effort has had a decided effect upon college enrollment. Freshman enrollment in engineering during the current academic year reached an all-time high of 45,620. This is 34% higher than it was in the academic year 1940–1941; the total freshman enrollment in all subjects has decreased, however, more than 6% during this same period. This is truly a remarkable change in choice of college curricula. Under the present Selective Service directives, all of these engineering students are eligible for occupational deferment and upon graduation will be able to satisfy a large part of industry's demand for additional engineers.

This same survey, which was made in November, 1942, showed that the number of senior engineering students in school at that time was 17,312, about 40% of whom were committed to the armed forces through membership in enlisted reserve programs. It should be remembered that even though a student is in the Enlisted Reserve Corps he will not be able to join the armed forces if he cannot pass the physical examination; therefore a certain fraction of these students who are ostensibly committed to the armed forces will yet be returned to industry. In ceramic engineering this survey showed 110 seniors out of a total of 502 undergraduates enrolled in 11 institutions.

As mentioned earlier, the United States Employment Service has just made for the Roster a survey of professional employment in most of the industrial establishments throughout the country. In this survey, a prelisted form was used in which information on current employment, labor needs, and anticipated layoffs for the next six months was requested in each of thirty-three professions. One of the professions for which information was requested was ceramic engineering. On the basis of preliminary returns from 14,943 industrial establishments, mostly in essential industry, this survey shows that in March, 1943, there were employed 458 ceramic engineers. The anticipated hires for the next six months were stated to be 23, with no anticipated layoffs. The anticipated hires thus amount to 5% of the current employment, which compares with a figure of $8^1/_2$% for the general field of engineering. The ratio of anticipated hires to current employment is greatest in the field of aeronautical engineering, where it is over 30%.

VI. Conclusion

Sir Roy Fedden, Chairman of the recent British Air Mission to the United States, stated upon his return to

Great Britain that American aircraft factories employ about five times as many draftsmen and engineers as do the British factories. According to him, this is one of the big reasons why we have made such strides in the design and in stepping up the production of planes. For example, in the past year and a half these engineers have been largely responsible for cutting in half the number of man-hours required for the manufacture of a given plane. Think what that means in the terms of total production.

There is no doubt but that the United States is more lavish in its use of engineers than are most other countries. If, however, in this manner it is possible to improve the design of a piece of equipment or to speed up its production, and, by doing either one, hasten the end of the war, this larger employment of engineers is certainly justified.

National Roster of Scientific and Specialized Personnel
War Manpower Commission
Washington, D. C.

PROBLEMS BUSINESS SHOULD CONSIDER*

By James H. Greene†

I. Introduction

I am neither a prophet nor the seventh son of a prophet. I enjoy reading the weekly material issued by the business forecasters, but I do not envy their position. A great deal of information comes over my desk, both in written and oral form, so I think that I am in a position to discuss some of the problems which businessmen must consider. I want to direct your attention, therefore, to a number of problems, the first of which is postwar planning.

II. Postwar Planning

(1) Three Viewpoints

There are three viewpoints regarding postwar planning. For want of a better term, one might be called a "radical" viewpoint, i.e., a fatalistic viewpoint which might be boiled down and epitomized as follows: Business failed in the last depression to cope with such a situation as will confront us in the postwar period; the problem therefore will have to be dumped into the lap of the Government.

At the opposite pole is the "conservative" opinion, which might be summed up like this: After every war, we have had a period of business recession in which business has somehow wiggled through and weathered the storm. We have had some unemployment and, just as has happened in the past, there again will be such a period, but with our usual American ingenuity we will get out of it, we will come through, and everything will be all right, so why make any plans? In fact, such plans might detract from the war effort itself.

The third viewpoint, which I call a "realistic" viewpoint, might be summed up as follows: We are in a different period than we have ever been in before, more men will return from the armed forces (perhaps distributed over a period of time but nevertheless in a total quantity larger than we have ever before had to reassimilate into our civilian population), and large numbers of these men are going to feel definitely that the effort they have made entitles them to consideration. We already have laws on our statute books looking in that direction. These men must have jobs. If business cannot provide these jobs, then it must be the duty of the Government (and some of them will think perhaps paternalistically) to provide them. If the jobs are not forthcoming, political pressure in some form or another will be brought to bear, and a huge federal job-giving program will result.

There are both conservative and radical forces in business and in Government. The conservative forces are headed by a man like Jesse Jones. Under the auspices of his Department, the Department of Commerce, a Committee for Economic Development has been set up which believes that business should have the first opportunity to handle the unemployment problem. On the other hand, there are those who point out that the Government, through its investments and through the Defense Plant Corporation, already has large financial stakes in business enterprises and to properly implement a general reemployment program this financial relationship should be continued. Business therefore would have the Federal Government as a partner in many cases, much as bankers designate persons from their directorates to sit upon the boards of corporations in which they have large financial interests.

Business will need capital which can come from two sources, viz., (1) from the Federal Government, which is the largest investor in business enterprise or (2) largely (as in the past) from those reserves which have been built up by private investors and corporations. From the radical viewpoint, the Government has a chance to control investment if (1) it continues to take away by taxation all of the profits derived from private business and (2) it forbids private business to build up essential reserves for the postwar period.

From the conservative viewpoint, the tax program must be modified so that business will be permitted to build up these reserves which will make a postwar program possible.

Let us, however, examine certain phases of the realistic view, because I assume that we are going to be realistic about this matter. Without detracting in any way from the war effort itself, we can find time enough to pay attention to the realistic view of this postwar period.

The war may end rather suddenly, at least as far as our war with Germany is concerned. Perhaps that will be all to the good for us in the way of readjustment, because we will not have a large body of men to reassimilate all at once. If that part of the war does end (and even now we are seeing some evidences of it) we at least have built up certain stocks of war material to the point where we no longer have adequate means for shipping them abroad. There is even a rumbling that before the end of the war

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certain large corporations may have to revamp their war programs and return, at least in part, to the manufacture of civilian goods. The time element is such, therefore, that it may be well for us to think of this matter soon, if not immediately.

(2) Solving the Problem

Government agencies are already planning. The National Resources Planning Board has issued a report which has failed to receive intelligent or widespread consideration, but which, in the minds of certain persons, seems to convey a threat to business. Even though its reception has not been friendly, it should be considered. In addition, an independent Committee for Economic Development, of which Paul G. Hoffman, of the Studebaker Corporation, is chairman, has been set up under the auspices of the Department of Commerce.

The inclusion of public works in any kind of postwar program will be in the minds of some persons; in fact, the public works program will be the biggest part of the program to them Some of our public works planners, perhaps unwittingly, have created that impression. I attended a meeting recently in Washington and heard the details of a program of the State of New York which aggregated seven and one half billion dollars. Those responsible for it say frankly that it is an over-all program which will stretch over a long period of time and that they do not expect it to be realized in its entirety. Perhaps every state or municipality should devote a great deal of thinking to the development of such an over-all program which might be carried on over a period of years. Herbert Hoover believes that a public works program should be a reservoir to handle the problems of unemployment. Such a program might be played down during prosperous times when men are needed in private enterprise. When the unemployment cycle recurs, it might be used to take up the slack.

Mr. Prince of the General Electric Company has made some calculations in which he definitely sets within certain broad limits how much employment should be handled by a public works program and how much by private enterprise.[1] Careful, painstaking consideration on the part of anyone competent to judge a matter of this kind leads to the conclusion, however, that the bulk of this employment properly must be taken care of through private enterprise.

Something must be done about the whole social security program, which has been stimulated largely by what our British friends have done on the other side. We are not going as far as some of the advocates of a social security program would have us go. We are still thinking in terms of American enterprise, the venturing of capital, the venturing of labor, and we will not assure anyone an individual social security program without effort. We will, however, make it possible, insofar as anything can be made possible in a human way, for each man, if he does what he should, to have some chances of not being a charge upon the community.

[1] See also "Postwar Planning" by A. R. Stevenson, Jr., *Bull. Amer. Ceram. Soc.*, **21** [12] 314–17 (1942).

III. Competition Among Basic Materials

Dr. Hall of the Dow Chemical Company made two rather startling, thought-provoking statements at a recent meeting in Detroit: "One of the best things that could happen to this country would be the exhaustion of the entire crude oil supply during the war." . . . "We would then be forced to use as a substitute alcohol which, after all, is a perfect fuel; in the provision of alcohol in these huge quantities which would be required, we would solve part of our agricultural program by making use of marginal land which now is not entirely profitable on the basis upon which we operate in the agricultural field."

We may not hear so much about iron and steel, but we will hear a lot of aluminum, magnesium, and beryllium and a great deal more about plastics. Dr. Hall's statements at first need not be viewed with alarm, but the healthy competition which may easily come about in the postwar period may be one of the best things that can happen to American business.

A great deal has been said about the manner in which competition has been stifled. Some of it contains an element of truth. Much of it, of course, is based upon fanciful stories the muckrakers have circulated about the operation of large corporations, but we certainly are going to have to grapple with the problem of the cost of living over quite a period of time.

In this competition among basic materials, serious consideration will have to be given to the cost of doing business, the cost of transportation, and the cost of producing raw materials, and it may well be that in the words of the old backwoodsman "the battle will go to the one who gets there fustest with the mostest." In other words, in the reconversion program, the materials which can be produced readily in quantities for use at the lowest possible cost may, at least initially, have certain competitive advantages so that the speed of conversion and the availability of these materials will be one of the limiting factors.

IV. Bottlenecks in Commercial Development

We are prone to become impatient with some of the bottlenecks which we encounter. Perhaps unconsciously some of us become almost fascist in our thinking; we think that if we just had a chance to take hold of a certain situation we could straighten it out quickly and remove some of the bottlenecks. I am afraid that sometimes our friends in Washington indulge in this type of thinking. We shall always have to pay that particular price for the democracy which we enjoy, but that is one of the prices we *do* have to pay, hence it takes a little longer. We have more obstacles to overcome, but they should not in any way deter us from making heroic efforts to eliminate the following bottlenecks.

(1) Taxation

In this war period and the postwar period which will follow, will our corporations and businesses be permitted to have enough money out of a tax program to build up the reserves they must have to get back on a peacetime basis?

Two agencies in Washington, neither of which can be accused of being over-friendly to business, namely, the National Resources Planning Board and the Truman Committee, have both recommended to the Army and

Navy that in the renegotiation of contracts ample provisions should be made with the companies having contracts for setting up the necessary reserves to reconvert from a wartime to a peacetime basis.

(2) Transportation Regulation

The regulation of transportation is not uniform. Much of this deadwood may be cleared away during the war effort. A great deal is being done to bring together all of the phases of transportation into some working arrangement. Here again there are certain signs in the skies which to some persons are alarming. One of the chief quarrels certain elements in Congress have had with the National Resources Planning Board (and perhaps one of the reasons why the appropriation was not passed) was over one part in their voluminous report which implied that the only way in which the transportation system of this country could be handled was on a purely government-ownership basis. Today the Government controls air transportation and to all intents and purposes it controls water transportation. It would be comparatively easy to take over all highway transportation. The railroads would be the most difficult to assume. Some persons are unkind enough to say that the Department of Justice a short time ago made the first step in taking over the railroads when they went after one of the large western railroads in a suit in Chicago, and that if this were done under wartime auspices it would be comparatively easy to continue it during the postwar period.

An organization known as the Transportation Association of America has existed for some time. Their particular job is to offset any efforts toward government ownership of transportation. They know that there is some basis for being dissatisfied with our present transportation system, that we do not have the correlation between water and rail and rail and truck which we should have, and that in many places it is actually difficult to obtain a combination route even though it exists on paper. They have made a proposal which is not in its final, finished form, namely, that a government-supervised (but privately controlled) coordinating agency be set up on a regional basis, which in no way would attempt to take over the actual ownership of the lines of transportation.

In many cases citizens have been remiss. In Pittsburgh we are making plans for a terminal on one of our rivers which will enable us to transfer freight more easily from our rivers to rails, and vice versa, and to trucks and perhaps even (thinking in terms of transportation after the war) to air transportation. The elimination of this bottleneck will help reduce costs.

(3) Industrial Relations

We must settle once and for all, at least within a broad framework, the present relationship between capital, labor, and Government. There are persons who think we may return to the halcyon days of 1926. They, however, are just fooling themselves. The Wagner Act is not fair as far as employers are concerned. Employers may have been partly responsible, but that is water over the dam and there is no use of thinking about it. The period of regulation we are now entering does not seem to be quite the way to handle it. Inasmuch as the Supreme Court took the position that it did, the Hobbs' antiracketeering bill seems to be all right because it is aimed at correcting a particular situation. The bill probably will pass, but several state legislatures have now passed legislation which makes it mandatory for labor unions to register and render accounts. This legislation is designed, properly so, to correct certain abuses, but I still have a vivid recollection of prohibition and am not so sure but that we do not have too many laws now. By the same token, I am quite sure that we will not in this day and age have class legislation which will permit the Government to regulate labor unions without at the same time opening the door to the regulation of business itself. I am not at all sure, moreover, that this is the way to handle the situation. Perhaps the threat of such legislation may be a deterrent and may cause our labor friends to correct some of these abuses.

One of the smartest public relation gestures that has ever been made and one which industry and commerce might well pattern, is the publishing by the steel workers of their financial statement. Their public relations man worked on the statement for ten years, but they have once and for all stopped any criticism of what they do with their money. It is surely better to encourage such a procedure through educational methods than by legislation.

(4) Participation of Businessmen in Civic and Government Affairs

Businessmen are reluctant to accept civic leadership and responsibility. There have been notable exceptions, e.g., (1) Senator Albert Hawkes of New Jersey, a former president of the Chamber of Commerce of the United States; (2) Eric Johnson and the splendid record he is now making as president of the Chamber of Commerce of the United States; and (3) Paul Hoffman, president of the Studebaker Corporation, and the time and effort he is giving in the public interest. Such efforts are multiplied many times in communities and business organizations. The load, however, is being carried by too few persons, and if we are going to correct some of these situations and meet some of these problems, we must each one of us assume responsibility and do something about it.

V. Education

Every boy and girl should know how to earn a living. Such a situation would go a long way toward correcting some of the fuzzy and pink-tinged ideas that teachers and instructors and pupils and students sometimes have. In a system of this kind, if it is to become effective, individual businessmen and organized business must play a definite part.

In other words, we know enough and surely after this war we will have learned enough about shortcuts in education so that we can, without sacrificing any of the fundamentals from the elementary school on up or any of the cultural heritage which it is the duty and responsibility of education to pass on, incorporate such teaching in the curricula of the elementary school, the junior high school, the high school, and of course the college and university. Every community in cooperation with the administrative officials of these various types of educational institutions should make it possible for every boy and girl to learn, not

as an occasional or accidental part of extracurricular activities but as a part of his curricular activity, something about earning a living and having a definite part in it. There was a time when every boy or girl had some chores to do around home. Since Pearl Harbor (maybe in the black cloud we may find the silver lining) a great many persons have had to do for themselves chores which they paid to have done for them and which were a part of the old educational process that boys and girls of days gone by in rural and semirural areas had to go through to become real men and women.

Education presents a big problem. You in The American Ceramic Society are doing an educational job. You are primarily an educational organization. You are using your influence in universities and in engineering schools. I am trying to talk about such educational work on a much wider scale, and I believe in that type of educational program. Many of my educational friends are not as averse to it as they have been. They see, perhaps as a result of this war period, that such a program will have to be carried out.

VI. Summary

I have tried to point out that postwar planning is a problem we must keep one eye on even while we are going ahead with the war effort. Agencies which are not friendly to business are on the job, and if business does not do something itself, it may be forced to permit itself to be a party to procedures it does not believe in. The postwar period is going to be a period of intense competition among basic materials. There are certain bottlenecks in the picture, namely, transportation, taxation, industrial relations, and the participation of businessmen in civic and government affairs. If education is to be one of the most effective weapons of democracy against these isms, we must have a different type of education than we have ever thought of before, a type of education that has been practiced on a rather limited scale in cooperative educational movements between business groups and specific institutions, but which has to become much more widespread.

These are some of the problems businessmen *must* think about.

ACTIVITIES OF THE SOCIETY

REPORT OF SPECIAL COMMITTEE ON THE STATUS OF CERAMIC ENGINEERS WITH THE SELECTIVE SERVICE BOARDS*

The Special Committee on the Status of Ceramic Engineers with the Selective Service Boards carried on extensive discussions and correspondence during the first few months after it was appointed, but little was accomplished except that the differences of opinion and confusion caused by the many uncertainties of the situation were largely eliminated. A verbal report was made to the Board of Trustees in Pittsburgh, Pa., on June 1, 1942, by the Chairman. At this meeting, the Board decided with the approval of the Institute of Ceramic Engineers that the whole problem should be approached by this Special Committee representing The American Ceramic Society as a whole.

To facilitate the work, the Chairman then appointed three subcommittees to approach the problem from different angles. These committees and their objectives are as follows:

Committee A (H. M. KRANER, Chairman): Objective: To obtain and organize data and information and approach Mr. Hershey's office for the inclusion of ceramic engineers with other groups of engineers for consideration by Selective Service Boards.

Committee B (C. E. BALES, Chairman): Objective: To obtain and organize data for each branch of ceramics to be used by employers and ceramic engineers in convincing Selective Service Boards that ceramic engineers are more valuable in the industry than in the service.

Committee D (A. S. WATTS, Chairman): Objective: The deferment of ceramic engineering students; to obtain data showing why this is important.

Professor Watts submitted three reports of his Committee which consisted of M. E. Holmes and J. W. Whittemore in addition to himself.†

* Committee personnel: C. E. Bales, E. H. Fritz, M. E. Holmes, H. M. Kraner, E. P. Poste, A. S. Watts, and A. I. Andrews, *Chairman*.

† These reports were published in the January, March, and April, 1943, *Bulletins*, pp. 16, 71–72, and 119, respectively.

The situation with regard to the supply of ceramic engineers became constantly worse and with the issuance of Occupational Bulletin No. 11 to the Selective Service Boards a meeting was called of the whole Committee at Columbus, Ohio, on March 16. Those present at this meeting were C. E. Bales, J. L. Carruthers, R. M. King, H. M. Kraner, A. S. Watts, and A. I. Andrews.

It was decided that our efforts short of a personal visit to Paul V. McNutt were of no avail. It was therefore recommended by the Committee that the President of The American Ceramic Society, Louis J. Trostel, the President of the Institute of Ceramic Engineers, H. M. Kraner, and several other influential men should take a resolution from the Board of Trustees to Mr. McNutt in Washington and present our case to him.

A resolution with supporting data was drawn up, the Committee request was made to President Trostel, and copies of the resolution were sent to the members of the Board of Trustees for their approval. This resolution is as follows and steps have been taken by President Trostel and President Kraner to carry out the suggestions of the Committee.

To Honorable Paul V. McNutt,
War Manpower Commission,
Washington, D. C.

WHEREAS, The ceramic profession desires to contribute its maximum effort toward the prosecution of the war and the winning of the peace to follow, and

WHEREAS, The maximum and efficient utilization of the Nation's natural raw materials is essential for this purpose, and

WHEREAS, The utilization of the Nation's raw materials involves essentially the mining and processing of the raw materials, and

WHEREAS, Mining engineering, metallurgical engineering, and ceramic engineering are the branches of engineering that provide for these operations, and

WHEREAS, All three must be maintained for an adequate and complete program of this kind, and

WHEREAS, Mining and metallurgical engineering have already been recognized as essential, and

WHEREAS, Ceramic engineering, which is the branch of engineering that deals with the utilization of nonmetallic

ores corresponding with the utilization of metallic ores by metallurgical engineering, has so far been omitted from the branches of engineering entitled to favorable consideration for the deferment of students in this field, and

WHEREAS, There is quite a shortage of ceramic engineers, and

WHEREAS, This shortage is rapidly becoming acute owing to the present policy regarding the deferment of ceramic engineers, and

WHEREAS, The productivity of a million-dollar industry, much of which is essential to the war effort, is at stake, and

WHEREAS, Many ceramic products, such as refractories, abrasives, glass, and electrical porcelain, are essential, and

WHEREAS, The ceramic industries of the country through their national organizations, such as The American Ceramic Society and the Institute of Ceramic Engineers, approve of and endorse this attitude, and

WHEREAS, Ceramic engineers have a basic training in mathematics, chemistry, physics, and engineering drawing, as well as a specialized branch of chemical engineering, which fits them for filling a wide variety of jobs other than in the specialized field of ceramics, and

WHEREAS, Educational institutions are equipped and ready to proceed with research in the interest of the war effort, and

WHEREAS, Research dealing with the solution of present problems connected with the nonmetallic industry is essential to our war effort and our ceramic educational institutions, and

WHEREAS, Draft boards have not been instructed to look with favor upon the deferment of ceramic engineers and ceramic engineering students, therefore be it

Resolved, That The American Ceramic Society earnestly recommend to the War Manpower Commission that consideration be given to the proposal to include in Occupational Bulletins 10 and 11 ceramic engineering on the same basis as mining and metallurgical engineering.

Board of Trustees,
The American Ceramic Society, Inc.

.....*President*

.....*General Secretary*

In support of this resolution, we respectfully submit the following facts and detailed information.

Ceramic Engineering (official definition approved by The American Ceramic Society): "The branch of engineering concerned with (1) the mining, refining, and processing of the minerals and rocks, except coal, oil, and ores as such, (2) the manufacture of products therefrom, and (3) the design and construction of the necessary equipment and structures."

The war has created many new problems in ceramics involving new raw materials, new processes, and the replacement of strategic metals. These problems must be solved by ceramic research and development. The shortage of steel, aluminum, copper, zinc, and alloys has brought to the ceramic industry many new problems which must be met and solved if many of our important wartime needs are to be satisfied.

REPORT OF SUBCOMMITTEE A (see p. 185)
REPORT OF SUBCOMMITTEE D

Place of the Ceramic Engineer in the War Effort

Engineers are primarily concerned with energy, materials, men, transportation, and structures. Various specialized fields of engineering education have been developed for the training of men to deal with the problems in the several fields.

The materials of industry come from the land, the sea, the air, and by-products of various processes. The ceramic engineer is concerned with the problems of using nonmetallic minerals in the manufacture of useful products for both industrial and domestic use. These minerals include the clays, feldspars, quartz, diaspore, bauxite, kyanite, talc, pyrophyllite, dolomite, lime, etc.

Ceramic products vital to the war effort include:

(1) Refractories of several types for (*a*) lining metal recovery furnaces, (*b*) heat-treating of metals, and (*c*) steam power plants in industry and on ships.

(2) Abrasives of several types for cutting, grinding, and polishing metal parts for all kinds of industrial and war equipment.

(3) Electrical insulators for radios, electronic devices, spark plugs, and light and power wiring.

(4) Vitrified dinnerware for naval vessels and army camps.

(5) Glass products for optical instruments, industrial chemical processes, and heat insulation; for food containers, windows, etc.

(6) Structural clay products for industrial buildings, military housing, drainage of airports, and sanitary sewers.

(7) Sanitary ware for army camps, ships, and industrial housing.

(8) Chemical stoneware and porcelain for laboratory and industrial service.

(9) Porcelain enameled ware for field kitchens, chemical processing equipment, etc.

If all of these industries are to render effective service in the war effort, trained ceramic engineers must control materials, processes, and products.

Shortage of Ceramic Engineers in Industry

Between January 1 and December 31, 1942, the ceramic engineering departments of American universities have had 251 requests for graduates of which they were able to supply 65, indicating a shortage of 186.

NOTE: All requests have been catalogued and where a request was made to several schools the duplication has been eliminated.

Industry	Men requested	Men supplied	Deficit
Abrasives	6	1	5
Alumina	11	3	8
Common brick	2	0	2
Cement	10	5	5
Colors	1	0	1
Crucibles	2	0	2
Cryolite	2	0	2
Dinnerware	9	3	6
Electrical porcelain	11	3	8
Fireproofing	1	0	1
Glass	21	8	13
Gypsum products	3	0	3
Machinery	2	0	2
Magnesium	5	2	3
Porcelains (special)	11	3	8
Pottery	5	1	4
Publications (technical)	2	0	2
Raw materials (miscellaneous)	6	3	3
Refractories (general)	39	11	28
Refractories (porous)	21	6	15
Steel	14	8	6
Research	32	5	27
Sanitary ware	6	0	6
Sewerpipe	4	1	3
Spark plugs	6	2	4
Steatite insulators	7	0	7
Tile	4	0	4
Enamels for metal	8	0	8
	251	65	186

In compiling these data on requests and placements, no record of men requested by or placed in Government bureaus is included.

The search for available men from nonessential industries has practically exhausted this source, and unless men can be made available from the students completing their education, we can offer no solution to the problem.

January 31, 1943 —ARTHUR S. WATTS, *Chairman,*
Subcommittee D

SUMMARY OF THE PRESENT SITUATION

The occupational deferment of ceramic engineers from military service depends upon the merits of each particular case. There are no blanket deferments of any groups based on employment. The Selective Service System is designed to analyze each man's case and determine whether he is more useful to the war effort by remaining in his present employment or by going into the service.

To obtain deferment it is necessary that (*a*) the man himself must be willing to be deferred, (*b*) the employer must be willing to request deferment, and (*c*) the draft board must be convinced that the man should be deferred. The Selective Service Boards are guided by bulletins from Mr. Hershey's office and, although ceramic engineers have never been recommended in these bulletins for special consideration, they do fall into other groups such as mineral technologists and chemical engineers which have been thus mentioned.

From the foregoing, one might assume that ceramic engineers have been deferred whenever it was justifiable and desirable that they should be. This, however, is not true. In many cases, the man himself does not feel that he is justified in accepting deferment, or the uncertainty of the situation may cause him to enlist in a branch of the service where he would prefer to be rather than take the chance of being drafted into some branch where he would not be taking full advantage of his experience and training and therefore not contributing his maximum toward the winning of the war.

In many cases, the employer hesitates to request deferment for a man because he feels that it might weaken his case when deferment of an even more essential man is desired at a later date. The employer may feel that it is his patriotic duty to get along with a minimum of technical help. In other cases, the man may not be essential in his present position, and, because he does not shift into some other position, he is inducted by the Selective Service Board.

Ceramic engineers are sometimes refused deferment because the case put before the Board is not convincing even though the man is in essential employment. As many of the men on these Boards are not acquainted with ceramics, it is necessary to elaborate considerably on the significance of the man's particular work to the war program.

As a result, our supply of ceramic engineers is being depleted to a critical point. These men cannot be replaced, and the progress of production and development in the war program is being impeded.

Students in ceramic engineering face the same problems in deferment as the men in the industry. They are generally young men without dependents and they feel keenly the question that is frequently put to them, "Why are you not in the Army?" As a result of this, few of them want to accept deferment, even though it can be obtained. Deferment of ceramic engineering students has never, to our knowledge, been refused when requested. These men often feel that they should be in service and that they can do more for the war program and themselves by enlisting than by going into the industry. By signing up in the Reserve Officers Training Corps, the Enlisted Reserve, the V–1 or V–7 Program of the Navy, the Air Corps, or some other branch of the service their opportunities are greater than they are when drafted. The result is that nearly all students in ceramic engineering are now enlisted in some phase of the services. These enlisted students are being called, and the enrollments in the ceramic schools of the country are disappearing.

As many of the colleges and universities of the country are signing contracts with the Army and Navy to train enlisted men for specialized service, the teachers in the ceramic departments will probably be required to devote a considerable amount of their time to this program. This will result in few, if any, men being trained as ceramic engineers.

OCCUPATIONAL BULLETINS, ETC., ISSUED BY SELECTIVE SERVICE SYSTEM*

Occupational Bulletin No. 10

June 18, 1942

SUBJECT: Scientific and Specialized Personnel

EFFECTIVE: Immediately

DISTRIBUTION: State Directors, Board of Appeal Members, Local Board Members, and Government Appeal Agents

PART I

(1) There are certain persons trained, qualified, or skilled in scientific and specialized fields who, if engaged in the practice of their respective professions, are in a position to perform a vital service in activities necessary to war production and in activities essential to the support of the war effort.

PART II

(1) The National Roster of Scientific and Specialized Personnel has certified to the Director of Selective Service that in activities necessary to war production and in activities essential to the support of the war effort, there are certain "critical occupations" which for the proper discharge of the duties involved require a high degree of training, qualification, or skill in scientific and specialized fields. The critical occupations in these scientific and specialized fields, as certified to the Director of Selective Service, are appended.

(2) All of these critical occupations, as listed, require highly specialized periods of training of two years or more. The critical occupations on the appended list exist within the provisions of Part V, Memorandum to All State Directors (I–405).

PART III

(1) The National Roster of Scientific and Specialized Personnel has certified to the Director of Selective Service that there are serious shortages of persons trained, qualified, or skilled to engage in these critical occupations in activities necessary to war production and in activities essential to the support of the war effort. These shortages exist within the provisions of Part VII, Memorandum to All State Directors (I–405), and accordingly careful consideration for occupational classification should be given to all persons trained, qualified, or skilled in these critical occupations and who are engaged in activities necessary to war production or essential to the support of the war effort.

PART IV

(1) There are many registrants who are in training and preparation to acquire the qualification or skill to engage in these critical occupations. Normally the period of training and preparation to acquire the necessary qualification or skill in these scientific and specialized fields extends over a period of four academic years in a recognized academic, professional, or technical college or university. In many instances, however, it is necessary for persons to have additional study in a recognized academic, professional, or technical college or university in order to acquire the more highly specialized qualification or skill necessary for the performance of particular services in activities necessary to war production or essential to the support of the war effort. Persons engaging in further studies in addition to the four academic years normally required are referred to as graduate or postgraduate students.

(2) A registrant who is in training and preparation for one of these scientific and specialized fields may not be

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* Issued from National Headquarters, 21st and C Sts., N. W., Washington, D. C.

considered for occupational classification until the close, or approximately the close, of his second or sophomore year in a recognized college or university.

(3) A registrant who is in training and preparation for one of these scientific and specialized fields may be considered for occupational deferment at the close, or approximately at the close, of his second or sophomore year in a recognized college or university if he is pursuing a course of study upon the successful completion of which he will have acquired the necessary training, qualification, or skill, and if he gives promise of continuing and will be acceptable for continuing such course of study and will undertake actual further classroom work within a period of not to exceed four months from the close of his second year.

(4) A registrant who is in training and preparation for one of these scientific and specialized fields shall be considered for occupational classification during his third and fourth years in a recognized college or university, provided that he gives promise of the successful completion of such course of study and the acquiring of the necessary degree of training, qualification, or skill.

(5) A graduate or postgraduate student who is undertaking further studies for these scientific and specialized fields, following the completion of the normal four academic years, may be considered for occupational classification if, in addition to pursuing the additional studies, he is also acting as "graduate assistant" in a recognized college or university or is engaged in scientific research related to the war effort and which is supervised by a recognized Federal agency. A graduate assistant is a student in postgraduate studies who, in addition, is engaged in the teaching and instruction of undergraduate students in these scientific and specialized fields.

(6) When a registrant has completed his training and preparation in a recognized college or university and has acquired a high degree of training, qualification, or skill in one of these scientific and specialized fields, such registrant should then be given the opportunity to become engaged in the practice of his profession in an activity necessary to war production or essential to the support of the war effort. In many instances following graduation from a recognized college or university, a certain period of time will be required in the placing of trained, qualified, or skilled personnel in an essential activity. When a registrant has been deferred as a necessary man in order to complete his training and preparation, it is only logical that his deferment should continue until he has an opportunity to use his scientific and specialized training to the best interest of the nation. Accordingly, following graduation from a recognized college or university in any of these scientific and specialized fields, a registrant should be considered for further occupational classification for a period of not to exceed sixty days in order that he may have an opportunity to engage in a critical occupation in an activity necessary to war production or essential to the support of the war effort, provided that during such period the registrant is making an honest and diligent effort to become so engaged.

—Lewis B. Hershey, *Director*

CRITICAL OCCUPATIONS
SCIENTIFIC AND SPECIALIZED PERSONNEL

(See Part II, p. 182)

Accountants
Chemists
Economists
Engineers: Aeronautical, automotive, chemical, civil, electrical, heating, ventilating, refrigerating, air conditioning, marine, mechanical, mining, and metallurgical (including mineral technologists), radio, safety, and transportation (air, highway, railroad, water)
Geophysicists
Industrial managers
Mathematicians
Meteorologists
Naval architects
Personnel administrators
Physicists (including astronomers)
Psychologists
Statisticians

Occupational Bulletin No. 34
Production of Stone, Clay, and Glass Products

Published in *Bull. Amer. Ceram. Soc.*, 22 [1] 15 (1943).

Selective Service Instructions to Draft Boards on Classification of Scientific and Specialized Personnel
(Official Test)

Local Board Release No. 159
Effective: November 7, 1942
Subject: National Committees for Critical Scientific Fields

(1) *Shortages in certain fields:* In certain scientific and specialized fields there may occur, from time to time, critical shortages of persons who possess or who are in training or preparation to acquire the high degree of training, qualification, or skill necessary to engage in activities essential to war production or essential to the support of the war effort.

(2) *National Committees may be authorized:* When the War Manpower Commission has determined that there is such a critical shortage in scientific or specialized fields, the Director of Selective Service may authorize the appointment of a National Committee in that field, to assist the Selective Service System by reviewing affidavits for occupational classification.

(3) *Filing Affidavit Occupational Classification:* When such a National Committee has been appointed for a scientific or specialized field, the employer or recognized university or college desiring occupational classification for a registrant who possesses the training, qualification, or skill in that field, or is in training or preparation therefore may prepare Affidavit Occupational Classification (Form 42 or 42A) in duplicate, file the copy with the local board in the usual manner, and forward the original to the National Committee.

(4) *Action by the National Committee:* When the National Committee receives a Form 42 or 42A, it will investigate the registrant. If, in its opinion, the registrant possesses the training, qualification, or skill and is a necessary man in an essential activity or a necessary man in training or preparation therefor, the National Committee is authorized to place a stamped endorsement prescribed by the Director of Selective Service on the original Form 42 or 42A and to file the form with the registrant's local board.

(5) *Consideration by local board:* When the original Form 42 or 42A, stamped by the National Committee, is received by the local board, it shall be considered as showing that the registrant has been investigated, that in the opinion of the National Committee he possesses the training, qualification, or skill required, and that, as the case may be, he is a necessary man in an essential activity or a necessary man in training or preparation in such scientific and specialized field.

(6) *Classification Advice (Form 59):* When a Form 42 or 42A, stamped by a National Committee, has been received for a registrant and the local board, nevertheless, classifies the registrant as available for military service or for assignment to work of national importance, the local board shall notify the National Committee, as well as the employer or university or college, by mailing to the National Committee and to the employer or university or college, Classification Advice (Form 59). In such case the National Committee, as well as the employer or university or college, may appeal to the board of appeal for classification of the registrant.

(7) *National Committees:* Appended is a list of National Committees for scientific and specialized fields authorized by the Director of Selective Service.

—Lewis B. Hershey, *Director*

LIST OF NATIONAL COMMITTEES*

Authorized by the Director of Selective Service to review affidavits for occupational classification in the scientific and specialized fields indicated:

* From Daily Labor Report, November 25, 1942.

Physicists

The National Committee on Physicists, National Roster of Scientific and Specialized Personnel, Washington, D. C.

Occupational Bulletin No. 10

(Amended March 1, 1943)

EFFECTIVE: Immediately
SUBJECT: Scientific and Specialized Personnel

(1) *Persons qualified:* There are certain persons trained, qualified, or skilled in scientific and specialized fields who, if engaged in the practice of their respective professions, are in a position to perform vital service in activities essential to war production and to the support of the war effort.

(2) *Critical occupations:* The War Manpower Commission has certified that in certain scientific and specialized fields there are critical occupations, which, for the proper discharge of the duties involved, require a high degree of training, qualification, or skill. Appended is a list of critical occupations in scientific and specialized fields (see this issue, p. 183).

(3) *Consideration of occupational classification:* The War Manpower Commission has certified that there are serious shortages of persons trained, qualified, or skilled to engage in these critical occupations. Accordingly, careful consideration for occupational classification should be given to all persons trained, qualified, or skilled in these critical occupations and engaged in activities necessary to war production or essential to the support of the war effort.

—LEWIS B. HERSHEY, *Director*

Occupational Bulletin No. 11

(Amended March 1, 1943)

EFFECTIVE: Immediately
SUBJECT: Student Deferment

(1) *General Policy on Student Deferment*

The War Manpower Commission has certified that there exists a serious need for additional persons in scientific and specialized fields and in certain of the professions. They are needed to perform vital services in activities essential to war production, to the support of the war effort, and in activities, the maintenance of which is necessary to the health, safety, and welfare of the Nation.

The subject of this occupational bulletin covers the eligibility of certain students for deferment. Careful consideration for occupational deferment should be given students included herein.

(2) *Students, Regular Courses, Scientific and Specialized Fields*

(*a*) *Undergraduate students*

A student in undergraduate work in any of the scientific and specialized fields listed in paragraph (*c*) should be considered for occupational classification if he is a full-time student in good standing in a recognized college or university and if it is certified by the institution that (1) he is competent and gives promise of successful completion of such course of study and (2) if he continues his progress he will graduate from such course of study on or before July 1, 1945.

(*b*) *Graduate students*

A graduate or postgraduate student undertaking further studies in the scientific and specialized fields, listed in paragraph (*c*), following completion of his normal undergraduate course of study should be considered for occupational classification if in addition to pursuing further studies, he is also acting as a graduate assistant in a recognized college or university. A graduate assistant should be a student who in addition to pursuing such further studies is engaged in (1) scientific research certified by a recognized federal agency as related to the war effort or (2) classroom or laboratory instruction in one of these scientific or specialized fields for not less than twelve hours per week.

(*c*) *Scientific and specialized fields*

Aeronautical engineers
Automotive engineers
Bacteriologists
Chemical engineers
Chemists
Civil engineers
Electrical engineers
Geophysicists
Heating, ventilating, refrigerating, and air conditioning engineers
Marine engineers
Mathematicians
Mechanical engineers
Meteorologists
Mining and metallurgical engineers (including mineral technologists)
Naval architects
Petroleum engineers
Physicists (including astronomers)
Radio engineers
Safety engineers
Sanitary engineers
Transportation engineers (air, highway, railroad, water)

(3) *Students: Medical, Dental, Veterinary, Osteopathic, Theological*

(*a*) *Undergraduate, preprofessional students*

A student in premedical, predental, preveterinary, preosteopathic, and pretheological fields should be considered for occupational classification if he is a full-time student in good standing in a recognized college or university, and if (1) it is certified by the institution in which he is pursuing the preprofessional course of study that if he continues his progress he will complete such preprofessional course of study on or before July 1, 1945, and (2) it is certified by a recognized medical, dental, veterinary, osteopathic, or theological college that he is unqualifiedly accepted for admission and will undertake professional studies upon completion of his preprofessional work.

(*b*) *Students in professional schools*

A registrant who is in training and preparation as a medical, dental, veterinary, or osteopathic student in a trecognized medical school, dental school, school of veterisnary medicine, or school of osteopathy (a student preparing for the ministry in a theological or divinity school recognized as such a school prior to September 16, 1939, is exempt from training and service under the provisions of the Selective Training and Service Act of 1940), should be considered for occupational classification during the period of such professional course, provided he is a full-time student in good standing, and if (1) he continues to maintain good standing in such course of study, and (2) it is certified by the institution that he is competent and gives promise of the successful completion of such course of study and acquiring the necessary degree of training, qualification, or skill to become a recognized medical doctor, dentist, doctor of veterinary medicine, or osteopath.

(*c*) *Internes*

A registrant who has completed his professional training and preparation as a medical doctor, dentist, or osteopath, and who is undertaking further studies in a hospital or institution, giving a recognized interneship, should be considered for occupational classification so long as he continues such interneship, but for a period not to exceed one complete year.

(4) *Students of Agriculture, Forestry, Pharmacy, and Optometry*

(*a*) *Undergraduate students*

A student in undergraduate work in agriculture, forestry, pharmacy, or optometry should be considered for occupational classification if he is a full-time student in good standing in a recognized college or university and if it is certified by the institution that (1) he is competent and gives promise of the successful completion of such course of study, and (2) if he has completed at least one-half of his undergraduate work and that if he continues his progress he will graduate in a number of months equal to the period of academic study which he has already completed.

Such deferment of students of agriculture, forestry, pharmacy, or optometry should not be for a period beyond July 1, 1943, pending further consideration of the status of such students.

(5) *Opportunity to Engage in a Profession*

When a registrant has completed his training and preparation in a recognized college or university, or his internship, and has acquired a high degree of training, qualification, or skill, such registrant should then be given the opportunity to become engaged in the practice of his profession in the armed forces or in an essential civilian activity. In many instances following graduation from a recognized college or university, or the completion of an internship, a certain period of time will be required in the placing of such persons in an essential activity. When a registrant has been deferred as a necessary man in order to complete his training and preparation, it is only logical that his deferment should continue until he has had an opportunity to put his professional training and skill to use in the best interest of the nation. Accordingly, following graduation in any of these professional fields or following an internship, a registrant should be considered for further occupational classification for a period of not to exceed sixty days, in order that he may have an opportunity to engage in a critical occupation of his profession in the armed forces or in an essential civilian activity, provided that during such period the registrant is making an honest and diligent effort to become so engaged.

—LEWIS B. HERSHEY, *Director*

REPORT OF SUBCOMMITTEE A

The function of this Committee was to gather data and information and approach General Hershey with the objective of obtaining the inclusion of ceramic engineers with other groups of engineers for consideration by the Selective Service Boards. This has been occasioned by the absence of ceramic engineers in Occupational Bulletin No. 10. Except to consider ceramic engineers as mineral technologists, this bulletin gave no consideration to ceramic engineers.

This Subcommittee consisted of L. J. Trostel and the writer with the view of the possibility that should we gather suitable data it would be desirable for the president of The Society to be one of the parties present when presenting the data to General Hershey. It was further considered wise that actual data should be gathered concerning ceramic engineers and the industry rather than continuing appeals without more forceful facts to back up such appeals. A questionnaire was developed inquiring into the extent of war work being done by our respective branches of the industry and with regard to the use of ceramic engineers in these industries. Several of our plant executives to whom this questionnaire was presented for criticism deemed such a questionnaire objectionable in view of the large amount of government inquiry already being conducted in business. Their alternate suggestion was that a number of men selected by the Committee might prepare a statement which would be equally suitable in putting across this general idea with the Selective Service organization. This approach was therefore dropped in favor of the use of information developed by A. S. Watts and N. W. Taylor on the shortage of ceramic engineers. Their articles appeared in the November, 1942, and January, 1943, issues of *The Bulletin* and showed the actual deficit of ceramic engineers in industry. On October 23, 1942, Occupational Bulletin No. 34 issued from the Selective Service System covering the stone, clay, and glass industries included professional engineers. Ceramic engineers were not referred to in this bulletin as such but inasmuch as the bulletin covered technical engineers in these industries, it covered their case in effect.

Occupational Bulletin No. 43 refers to technical and scientific management personnel including engineers but again specifically ceramic engineers were not mentioned in this bulletin.

Correspondence with the Selective Service System verified the contents of Bulletin No. 34 and Bulletin No. 43 to the effect that deferment of ceramic engineers comes within the scope of these two bulletins. Additional written appeals, however, to clarify the position of ceramic engineering students have not been answered by the Selective Service System.

Activity and Occupational Bulletin No. 35 dated March 1, 1943, covers deferment of fourteen kinds of engineers, but ceramic engineers are not included.

There appears to be a number of bulletins covering the case of engineers which would include ceramic engineers, although not by name. If we are not to consider these ample to cover ceramic engineers and make suitable strong appeals to our draft boards, we must go one step further and make a personal appeal to the proper agencies in Washington for recognition as ceramic engineers and ceramic engineering students.

This Committee does not believe that further correspondence will be of any value. As a move is under way to take a joint resolution of The American Ceramic Society and the Institute of Ceramic Engineers to Mr. McNutt, it is believed that the proper procedure has been started. This is somewhat in line with the suggestion that we obtain statements from men in industry, and it is with this thought in mind that we have considered the desirability of having men of industry accompany this group to Washington to submit this resolution to Mr. McNutt. It is further understood that another fact-finding effort of value is under way, namely, a survey by the National Roster of Scientific Personnel on the shortage of ceramic engineers. Their data is being supplemented by the data referred to by A. S. Watts and N. W. Taylor.

—H. M. KRANER, *President, Institute of Ceramic Engineers, and Chairman, Subcommittee A*

State Director of Selective Service — April 13, 1943
40 South Third Street
Columbus, Ohio

Subject: Ceramic Engineers

Dear Colonel Goble:

Reference is made to your letter of April 8 enclosing copies of communications with officials of The Ohio State University regarding the classification of ceramic engineers.

It is the opinion of this Headquarters that ceramic engineering is a specialized branch of chemical engineering and that therefore ceramic engineers may be considered for occupational deferment under the provisions of Activity and Occupational Bulletin Number 33–6.

EMMETT G. SOLOMON,
Major, Specialist Manpower Division

RECOMMENDATION OF THE CERAMIC EDUCATIONAL COUNCIL TO THE BOARD OF TRUSTEES*

WHEREAS, Ceramic education in the colleges of the United States has practically ceased, due to the absorption of ceramic students by the armed forces, by industry, or by transfer to curricula recognized as "essential" by government authorities; and

* Approved by the Council April 18, 1943.

WHEREAS, Several ceramic faculties have disintegrated, due to enlistment or resignation to enter industrial war work; and

WHEREAS, A very serious shortage of ceramic engineers and technologists exists at a time when the ceramic industries are particularly hard pressed to produce war materials; and

WHEREAS, This shortage will continue until at least four years after the war ends, due to the time needed to educate men to the grade of Bachelor of Science; and

WHEREAS, Ceramic education, which is of vital interest to The American Ceramic Society, is likely to suffer an irreparable injury; and

WHEREAS, These difficulties could have been avoided if there had been an understanding and appreciation on the part of the general public of the meaning of the term Ceramics and the scope and importance of the ceramic industries in war and in peace; now be it

Resolved, That the Ceramic Educational Council recommend to the Board of Trustees of The American Ceramic Society that a Publicity Campaign be organized under the auspices of the Trustees, with funds authorized by The Society, to acquaint the American public with the magnificent achievements and the "essential" role of ceramics, and to redefine this term so as to raise its meaning in the public esteem to a level now occupied by such well-advertised terms as Chemical, Mining Engineering, or Metallurgy.

—NELSON W. TAYLOR, *President*

FELLOWSHIP REPORTS

REPORT OF THE DEAN

The past year has been a year of experimentation with the proposed function of the Fellowship as a Senior Council, a group which should be qualified to give detailed consideration to the technical activities of The Society and to make recommendations thereon to the Trustees, on the assumption that the Trustees will usually be fully occupied with their primary function of managing the affairs and finances of The Society and determining its general policies.

As a consequence of our Annual Meeting in 1942 we made or approved eighteen recommendations to the Board at its final sessions in March, 1942, of which two were turned down* and sixteen adopted then or later. Of these, three dealt with personnel and eleven were concerned with new representation of The Society on ceramically allied committees of the American Society for Testing Materials and the American Standards Association. The Dean consulted with about thirty Fellows on these eleven projects and was thereby able to present further recommendations to the Trustees' meeting in August which cleared the ground of four projects and proposed specific action on the other seven. A further follow-up reduced the number to five committees on which we are either newly represented or on which representation is being negotiated.†

The Trustees have acted on our recommendation that a Committee on Classification and Nomenclature be created, by voting to ask the Committee on Rules to make provision for a Committee on Classification and Nomenclature in each Division, and to provide that the chairmen of these Division committees constitute a Society committee on the same subject, whose chairman will be appointed by the Trustees.

The Trustees, after receiving a report from the Institute of Ceramic Engineers, have turned over to the Fellowship the incomplete Ceramic Book List that was begun several years ago. This project has been set in motion again by the circulation for criticism of a proposed classification of the material.‡ An active committee will be appointed as the project develops, and you are all likely to be called upon to criticize, amplify, or condense particular parts of the list after the committee shall have prepared a first draft. The Fellowship funds may be drawn upon for publication of the list, and I urge this as a worthy reason for keeping up your payment of the voluntary dues.

The Trustees have twice requested that Fellowship recommendations be brought in two weeks or more before a projected meeting of the Board. The original proposal to utilize the Fellowship as a Society Senior Council contemplated only that it would be active at the time of the Annual Meeting, and that such recommendations as resulted from the consideration of reports and of new proposals at the annual meeting of the Fellowship would either be reported immediately to the Trustees or would be followed up to a conclusion during the year by the three officers of the Fellowship. The year's experience shows that this plan is workable. On the other hand, the preparation of recommendations several weeks in advance of any meeting of the Board, such as that held just before our Annual Meeting, either would call for extensive correspondence or would tend to make the recommendations merely one-man proposals by the Dean. Neither alternative is practicable, even in normal times. Such advance recommendations have therefore not been undertaken for this Annual Meeting.

A Committee on Rules was appointed in October to consider revision of our procedure for the nomination and election of Fellows, a procedure which, as indicated in my 1942 report, has not been entirely satisfactory. The Committee has consulted all of the past Deans in preparing its report and has gone considerably beyond its original assignment in proposing organic changes affecting the autonomous character of our present Fellowship organization. The subject should receive thorough and careful consideration at this meeting before amendments to our Constitution, By-Laws, and Rules are prepared for submission to the membership.

In the meantime, I have tried an experiment in the mechanics of election, by having all the data for each candidate reproduced on a single sheet by photolithographic reduction. The complete papers of twelve nominees were thus placed in the hands of the Fellowship Board on March 15, with a request for a preferential vote, numbering nominees from one to twelve with respect to which nominees were considered most deserving of election on the ground of the three types of qualification now incorporated in our Rules. The complete returns were on hand early in April, and I expect that they will be used as the basis for final election of five of the nominees by the Trustees. The reason for naming only five is the vote of the Fellowship at the 1942 meeting, reaffirming the earlier rule of limiting elections to ten per year; the Fellowship Board in 1942 recommended nineteen, of whom the Trustees finally elected fifteen. The selection of five this year will thus hold the average to ten per year.

—R. B. SOSMAN, *Dean*

* Refund of dinner charge in 1941 and discontinuance of Data Committee.

† A.S.A. A-6 and A.S.T.M. C-4, C-5, C-6, and C-7.

‡ For proposed classification, see April, 1943, *Bulletin*, p. 121.

REPORT OF SPECIAL COMMITTEE ON RULES

This Committee on Rules appointed by Dean Sosman in the latter part of 1942 was charged with the specific duty of considering the Rules as they relate to Fellowship elections. Our Committee was instructed to consult the previous Deans and to draw up recommendations concerning our method of electing Fellows and to report to the Fellowship.

The Committee made such a study, and, to simplify the

procedure in consulting the past Deans, sent out a questionnaire listing five items on which comment was requested.

Out of the nine past Deans, seven replied, all of whom approved each of the suggestions of the Committee, except for slight qualifications of one or two of the points in a few instances. The present Dean, the past Deans, and the Committee on Rules are therefore practically unanimous in their recommendation that the Rules be amended to accomplish the following:

Item 1: Make all votes of the Fellowship Board preferential, turning nobody down flatly but allowing a nomination to come up for successive years.

Item 2: Remove the requirement that the Division Chairman must approve the Fellowship applications in his Division. Substitute a requirement that the Division Chairman or Vice-Chairman merely certify that the candidate is a member of the Division.

Item 3: Rewrite the Qualifications for the Fellowship, retaining all the provisions but combining the separate statements into paragraphs to make the intent clearer.

Item 4: Set up definite rules of procedure for the Fellowship Board as already set forth by Dean Sosman and print them on the back of the nomination form.

Item 5: Add a sentence to Section (2) of Article I of the Rules of the Fellows to the effect that "Nomination shall be made on forms devised by the officers of the Fellowship and made available through the office of the General Secretary of The Society."

The special Committee on Rules recommends that amendments to accomplish the above be submitted to vote of the Fellowship in accordance with the Rules provided for such amendments, and, having carried out the specific instructions for which it was created, the Committee asks that it be discharged.

—D. E. SHARP, *Chairman*

REPORT OF COMMITTEE ON PROPOSED HISTORY OF CERAMIC EDUCATION

This Committee was appointed to consider the advisability of sponsoring the publication of a History of Ceramic Education in the United States, to be edited by T. T. Reed. Correspondence with the members of the Committee brought out a number of opinions and several alternative proposals.

It is generally held that the proposed book would have very little sales appeal and that it could scarcely be expected to pay for itself and would probably represent an actual net outlay by the Fellowship.

There is no support for T. T. Reed, who is not known to members of the Committee.

The present time is not regarded as favorable for the launching of a project of this kind.

It is agreed that the material is available, but opinions differ in the way in which it should be handled and how it could be collected, especially for use by an author not personally acquainted with the affairs of either the ceramic departments or The American Ceramic Society.

Certain alternative proposals have been advanced. Hewitt Wilson remarks that the early history of each school should be recorded by the living participants and not by someone else relying on secondhand information for a future compilation. "I suggest a study of The American Ceramic Society publications, and others, to see what early history is missing. This survey can be followed by short articles in *The Bulletin* to fill in the missing gaps. A bibliography on this subject would complete the present requirements."

R. C. Purdy suggests that as the curriculum content is being studied by the Ceramic Educational Council made up of professors, the Fellows might do a valuable service for education by setting up a committee for studying curriculum, the membership of which should be our successful industrialists and technologists in industrial employment. He thinks that although the amount of fundamental science taught is on the increase, there is too much of the empirical. "There should be less of the descriptions of processes and equipment and more on the fundamentals."

A. V. Bleininger remarks that a more worthy outlet for the energy required for writing such a book could be found in the preparation of a textbook dealing with the more recent aspects of the subject.

A. I. Andrews suggests that another desirable project would be the compiling into a single volume of the pictures and biographies of the men who have been written up in *The Bulletin of The American Ceramic Society*.

E. C. Henry, writing for N. W. Taylor and himself, presents an extended alternative proposition, referring to the fact that something of a history was written in 1923. "Since this time," he remarks, "a number of new departments have been organized, and the material should be brought up to date and the decided changes in curricula and in educational policies should be properly recorded." He summarizes his proposal as follows: "There does not seem to be a need for a complete history of ceramic education as such, but a series of articles might well be sponsored, for publication in *The Bulletin*, covering one or more of the following subjects: (1) histories of schools founded since 1923; (2) supplements to the 1923 histories; (3) a general discussion of trends in educational policies, changes in curricula, etc., and (4) a history of the Ceramic Educational Council."

Dean Sosman has also sent a reply to the questionnaire, making the following points: He expects that the sales would be small, about 500, probably making a subsidy necessary. The use of Fellowship funds is suggested and also possible support from the A.I.M.M.E. If Mr. Reed should be the editor or author, chemical and mining engineers and laboratories should be customers as well as the ceramic schools and departments. Mr. Reed has already prepared a similar book and could build ours as one chapter of his larger work. He suggests that a royalty of 20% could be split between the author and The Society. He does not favor postponement on account of the war unless it should cut off necessary materials. He remarks that "the war may last ten years or more, and we may as well get used to it." Dr. Sosman concludes: "I believe our materials are in good shape for collecting because so much has been published in our *Bulletin* and because the departments would, I believe, all be sympathetic and cooperative in furnishing their individual histories. I would suggest that a first draft be prepared by the author or editor and that this be critically reviewed and even rewritten by representatives of all the ceramic schools and departments. I should hope that the book would not be merely a chronicle but would present various views of what ceramic education should be as illustrated by what it has already been. This would make the book of continuing value and not merely something for the antiquarian."

My own opinion is in general agreement with the other members of the Committee. We suggest that the proposed book on ceramic education should not be undertaken at this time. We suggest that, if any historical material referring to any particular ceramic school or department is available but not in print, space could be found for the material in the publications of The Society; and we recommend that the Fellows urge the necessary steps to this end upon the several faculties, and also that the Fellows assist in this completion of record by providing whatever bibliography may be necessary or advisable. It is the judgment of the Committee that there is a greater need and demand for good textbooks in ceramics than for a History of Ceramic Education.

—A. I. ANDREWS, A. V. BLEININGER, E. C. HENRY, R. C. PURDY, HEWITT WILSON, AND S. R. SCHOLES, *Chairman*

REPORT OF COMMITTEE ON STANDARDS

The war has increased interest in standards; because of extra duties resulting from war work, however, the personnel of many organizations responsible for standards have been prevented from any great amount of effort along these lines. Consequently, there are many standards that have not been changed during the year and few

new ones have been established.

There are many organizations whose principal work is that of standards and whose personnel is made up of representatives from other organizations who are well informed and experienced in the particular subjects considered. Members of our Society, because of their knowledge and ability, are representatives on many of these organizations and contribute greatly to their success. Each year The Society appoints one or more persons to represent the membership of The Society on these organizations or their committees if the work has some ceramic interest. Reports of the activities of these organizations are submitted each year by these representatives and the reports are compiled in this report of the Standards Committee. The members of The Society may thus learn of the work that has been accomplished during the year. In cases where the member of The Society is interested in learning more details of definite work, he is referred to the publications of these organizations or to the representative of The American Ceramic Society on that organization.

The summaries of the activities of the several organizations as reported are herewith presented.

COMMITTEE REPORTS

American Foundrymen's Association

L. C. HEWITT, Laclede-Christy Clay Products Co., St. Louis, Mo.: Although there was no meeting of the Joint Committee on Foundry Refractories during the year, there has been continued work by the Committee on the preparation of a chapter on cupola refractories for a handbook that the Association has under preparation.

American Society for Testing Materials

Committee A-1 on Steel, H. F. STALEY, Metal & Thermit Corp., 120 Broadway, New York, N. Y.: No work of interest to the ceramic industry was conducted during the past year.

Committee C-8 on Refractories, J. W. WHITTEMORE, Virginia Polytechnic Institute, Blacksburg, Va.: This Committee has been unusually active during the past year. With the increased demand for war goods, there has been corresponding interest in refractories and specifications for the particular types for certain industrial uses. During the past few years, industrial surveys have been made of the refractory service conditions for Open-Hearth Practice, the Malleable Iron Industry, the Copper Industry, the Lead Industry, By-Product Coke Ovens, the Lime-Burning Industry, and Stationary Steam Boilers. These have been published in the Manual of A.S.T.M. Standards on Refractory Materials (1941). It is planned to revise the Manual and include similar surveys made on the Zinc Industry, Iron Cupola Practice, Electric Steel Furnaces, Water Gas Generators, and the Oil Industry. These surveys are of unusual value for the person interested in the usage of refractories.

Research on test methods for evaluating cold-set mortars has been conducted at Mellon Institute, Pittsburgh, Pa., with a recommended manner of conducting such a test. Other research work at this institution is helping to standardize the manufacture and use of refractories.

Six tentative standards have been adopted related to (1) sieve analysis of refractory materials and determination of the water content of refractory products in the wet condition; (2) a test method for the drying and firing shrinkage of fire-clay plastic refractories; (3) a test method for the workability index of plastic fire-clay refractories; (4) a test method for the resistance to thermal and structural spalling of fire-clay plastic refractories; (5) a test method for determining the thermal conductivity of insulating firebrick[1]; (6) air-setting refractory mortar (wet type) for boiler furnace and incinerator service.

There were also several revisions of existing tentative standards and standards, which keep them in accord with present-day practice.

[1] C. L. Norton, Jr., "Apparatus for Measuring Thermal Conductivity of Refractories," *Jour. Amer. Ceram. Soc.*, **25** [15] 451–59 (1942).

Committee C-14 on Glass and Glass Products, G. W. MOREY, Geophysical Laboratory, Washington, D. C.: Most of the work of this Committee for the past year consisted of the consideration of existing tentative standards so that they might be raised to the status of standards. This work has not been completed to date. The list of tentative standards so far created by the Committee is as follows:

C146–39T, Tentative Methods of Chemical Analysis of Glass Sand.
C147–40T, Tentative Method of Hydrostatic Pressure Test on Glass Containers.
C148–40T, Tentative Method of Polariscopic Examination of Glass Containers.
C149–40T, Tentative Method of Thermal-Shock Test on Glass Containers.
C158–40T, Tentative Method of Flexure Testing of Glass (Determination of Modulus of Rupture).
C162–41T, Tentative Definition of the Term "Glass."
C169–41T, Tentative Methods of Chemical Analysis of Soda-Lime Glass.

Committee C-15 on Manufactured Masonry Units, FREDERICK HEATH, JR., Owens-Corning Fiberglas Corp., Toledo, Ohio: Extensive revisions were made during the year of the specification for building brick made from clay or shale, and revisions of the specification for glazed masonry units were considered. All of the standard specifications and methods of test under the jurisdiction of the Committee were submitted to the American Standards Association for approval as American standards, which approval has since been granted.

A proposed method of test for the initial rate of absorption (suction rate) of brick was accepted and included in the Methods of Testing Brick. This test is of importance as it is often referred to in specifications for masonry walls.

Results of freezing and thawing tests on brick, conducted by J. W. McBurney at the National Bureau of Standards, have created an interest in including this test in the Methods of Testing Brick.

Committee D-3 on Gaseous Fuels, C. H. PARMELEE, Onondaga Pottery Co., Syracuse, N. Y.: This Committee has obtained financial aid in the prosecution of standards developments on certain impurities in gaseous fuels, which impurities are of interest to the ceramic industry.

The Rochester, N. Y., Gas and Electric Corporation has advanced money for research on these impurities, which research, at present, covers the analytical methods for the determination of various sulfur compounds and is being conducted at the Institute of Gas Technology in Chicago, Ill. These analytical methods will cover the determination of total organic sulfur, carbon disulfide, carbon oxysulfide, mercaptans, and thiophenes.

Previous work has already fairly well set up the standard method for the determination of total sulfur in the fuel, which includes hydrogen sulfide. The analytical methods being worked on may be ready for submission to Committee D-3 sometime in 1943.

Committee D-5 on Coals, A. W. GAUGER, Pennsylvania State College, State College, Pa.: The activities of Subcommittee I on Methods of Testing are of particular interest to the members of The American Ceramic Society.

A Special Section on Volumetric Methods for Sulfur Determination, under the chairmanship of C. A. Lunn, consisting of nine members, has completed a comprehensive study of volumetric methods for the determination of sulfur in coal and coke. This investigation was under the immediate supervision of S. S. Tomkins.

Samples of four coals, ranging in sulfur content from approximately 0.6 to 3.3%, were air-dried, reduced, and ground to pass through a 250-micron (No. 60) sieve, and representative portions were submitted to eight laboratories. These laboratories determined sulfur in triplicate by the present standard Eschka and bomb-washing methods whereby the sulfur is determined gravimetrically by weighing as barium sulfate and by two volumetric methods using tetrahydroxyquinone and sodium rhydizonate as

indicators. In these volumetric methods sulfur is recovered as soluble sulfates in the bomb washings or by leaching the Eschka residues. The advantages claimed for the volumetric methods are that they are less costly and time-consuming, especially when a large number of coal samples are tested daily.

On the basis of the results reported by the cooperating laboratories it was concluded that the volumetric methods will yield results of the same degree of reproducibility and accuracy as the present standard gravimetric method. The two volumetric methods are now under consideration as alternatives to the present standard gravimetric method. The detailed investigation is given in a paper entitled "Volumetric Determination of Sulfur in Coal and Coke" by S. S. Tomkins, *Ind. Eng. Chem., Anal. Ed.*, **14**, pp. 141–45 (1942).

A Special Section on Uniformity of Analytical Data, under the chairmanship of H. H. Lowry, has completed a study of application of statistical methods to determine the precision of the procedures given for the analysis of coal and coke in Standard Methods D271. A paper covering this investigation entitled "Statistical Study of the Precision of Methods for Analysis of Coal and Coke" by H. H. Lowry and Charles O. Junge, Jr., of the Coal Research Laboratory, Carnegie Institute of Technology, is to be presented at the annual meeting of A.S.T.M. A knowledge of this precision is of particular importance in any attempt to correlate performance of coals in various uses with coal analyses.

Nineteen governmental, institutional, industrial, and commercial laboratories collaborated in this study by furnishing the analytical data in duplicate, or multiplicate, generally on one hundred samples of coal or coke. To avoid bias in the selection of the data reported, each laboratory was asked to report the data beginning with the most recent determination of any given quality and continuing in inverse chronological order, with no omission, the results of individual analyses up to one hundred samples. These data were then analyzed by the method described by Deming and Birge in *Rev. Modern Phys.*, **6**, 158–60 (1934). This method of analysis assumes a distribution of errors in accord with the normal law of errors. Study of the data submitted has shown that this assumption may not be justified for only a few sets of data. There are presented in the paper the numerical results of the statistical study which should permit establishment of "permissible differences" of duplicate determinations on a single sample of coal or coke related definitely to the precision of the analytical procedures. The results considered in the paper do not permit any estimate to be made of the absolute accuracy of the analytical procedures covered in Standard Methods D271, although similar statistical methods could be applied to data if they can be made available.

American Society of Mechanical Engineers

Petroleum Division, H. R. STRAIGHT, Straight Engineering Co., Adel, Iowa: There have been no activities of this Division that are of ceramic interest.

Process Division, W. KEITH MCAFEE, Universal Sanitary Mfg. Co., New Castle, Pa.: This Division has had no activity related to the ceramic field for some time and very little work of the Division relates to standardization.

American Standards Association

Sectional Committee on Minimum Requirements for Plumbing and Standardization of Plumbing Equipment (*Project A–40*), HARRY WHITTAKER, Research Laboratories, Crane Co., Chicago, Ill.: The activities of this Committee may be summarized as follows:

(1) The proposed American Standard for Threaded Cast-Iron Pipe for Drainage, Vent, and Waste Services, which was prepared by a joint committee on Threaded Cast-Iron Pipe of Sectional Committees A–21 and A–40, was presented for vote on approval by letter ballot. When this standard is promulgated, it may be of interest in relation to clay pipe, sewer pipe, etc. Physical properties, sizes, tolerances, and hydrostatic tests are specified.

(2) Subcommittee No. 12 completed the proposed American Standard for Back-Flow Preventers and it was presented for vote of approval by letter ballot and approved. This standard is of interest in that it may influence the designs of sanitary ware. It is intended to publish the Standard on Back-Flow Preventers and the previously approved Standard on Air Gaps in Plumbing Systems together in the same pamphlet. The American Standard for Air Gaps in Plumbing Systems was approved with comments in the latter ballot and was printed for council approval in October, 1941. A Preface and Foreword have been prepared for publication of the two standards and submitted for comments January 25, 1943.

(3) Subcommittee No. 1 continued work on the American Standard Plumbing Code. The subgroup on this Committee presented and discussed draft copies of Sections 10, 11, and 12 of the proposed Code; Section 10, Soil Waste Pipes; Section 11, Storm Drains; and Section 12, Vents and Venting. The revised draft of Section 1, Definitions, was discussed. There were no releases of information outside the Subcommittee during the year. This work when it is completed will undoubtedly be of interest to producers of sanitary-ware products.

Sectional Committee on Recommended Practice for Brick Masonry (*Project A–41*), J. W. WHITTEMORE, Virginia Polytechnic Institute, Blacksburg, Va.: During the past two years a preliminary draft of building code requirements for masonry was submitted and considered by the Committee. On the basis of comments received a second draft was made and submitted for letter ballot. Unless adverse comment is received, the code as amended will be submitted for final approval.

Sectional Committee on Coordination of Dimensions of Building Materials and Equipment (*Project A–62*), FREDERICK HEATH, JR., Owens-Corning Fiberglas Corp., Toledo, Ohio: The Executive Committee of A–62 is drafting a Basis for Coordination which is to be submitted to the Sectional Committee and given widespread distribution to the building industry in the near future. Other activities of the Sectional Committee are as follows:

(1) A subcommittee, of which Harry Plummer is chairman, is reviewing a proposal for a 3-in. module and other bases which might be given consideration in place of the 4-in. module already adopted by the Executive Committee.

(2) The Modular Service Association has added many studies, developed in connection with the product subcommittees, to the technology of modular coordination.

(3) A subcommittee of architects is reviewing the technique of plan, elevation, section, and detail drawings based on this coordination.

(4) The Working Subcommittee on Masonry of Structural Clay Products is completing its initial presentation for modular sizes of its products which will be available for consideration by the Sectional Committee soon, following action on the Basis for Coordination.

The Modular Service Association, the Producers' Council, and the American Institute for Architects are pressing this standardization for early consideration, so that it will be available for general use in postwar building.

Sectional Committee on Scientific and Engineering Symbols and Abbreviations (*Project Z–10*), RALSTON RUSSELL, JR., Research Laboratories, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.: The Committee approved for publication as an American standard the report of Subcommittee No. 5 on Letter Symbols for Heat and Thermodynamics, Including Heat Flow. A proof dated February, 1943, is available from A.S.A.

Sectional Committee on Specifications for Sieves for Testing Purposes (*Project Z–23*), A. S. WATTS, Ohio State University, Columbus, Ohio: There have been no activities during the year; the Federal Specifications for Testing Sieves were revised, however, to conform with A.S.A. Standards, being issued as RR–S–366*a* dated April 29, 1942. No other specifications are now recognized as official, and any current reference to obsolete specifications should be reported to L. V. Judson, Secretary, A.S.A.

Committee Z-23, c/o National Bureau of Standards, Washington, D. C.

Sectional Committee on Specifications and Methods of Test for Safety Glass (Project Z-26), GEORGE B. WATKINS, Libbey-Owens-Ford Glass Co., Toledo, Ohio: There has been no activity of ceramic interest.

International Association for Testing Materials

S. M. PHELPS, Mellon Institute, Pittsburgh, Pa.: There has been no activity during the year of this organization.

International Chemical Congress

ALEXANDER SILVERMAN, University of Pittsburgh, Pittsburgh, Pa.: No meetings of the Congress have been held during the war nor are any in prospect.

Inter-Society Color Council

WOLDEMAR WEYL (Chairman for The American Ceramic Society delegation to the Council), Pennsylvania State College, State College, Pa.: Despite the serious restriction in coloring materials to be used for glasses, glazes, and whiteware bodies, several members of The American Ceramic Society have expressed their interest in the efforts of the Inter-Society Color Council especially in the standardization of terms to be used in color designation.

They have secured from Miss Dorothy Nickerson, Secretary of the Inter-Society Color Council, her paper on central notations for Inter-Society Color Council-National Bureau of Standards color names, for publication in *The Bulletin of The American Ceramic Society.*

Another item which has been submitted to the editor of the *Journal and Bulletin of The American Ceramic Society* is the American War Standard Specification and Description of Color.

Illuminating Engineering Society and Luminous Glassware Guild

W. C. TAYLOR (Chairman for The American Ceramic Society representatives), Corning Glass Works, Corning, N. Y.: Two papers have been presented before the Guild that are of interest to the members of The American Ceramic Society, viz., (1) "Alternate Materials for Luminaries" by E. H. Robinson (presented at the Wartime Lighting Conference of the Illuminating Engineering Society, St. Louis, Mo., September 21-23, 1942); (2) "Fluorescent Fatigue" by J. W. Marden and N. C. Beese (presented at the same meeting).

National Research Council

Division of Geology and Geography, G. W. MOREY, Geophysical Laboratory, Washington, D. C.

Division of Chemistry and Chemical Technology, G. W. MOREY.

Both of these organizations have been active, but because of the nature of the work it is impossible to report on these activities during the duration of the war.

As Chairman of the Committee on Chemical Data for Ceramists (other members, F. D. Rossini and G. W. Morey) of the Division of Chemistry and Chemical Technology of the National Research Council, Alexander Silverman has completed a 182-page report which was submitted to the National Research Council. It has been approved for distribution to glass and ceramic manufacturers who subscribed to the fund which made this research possible. The editor of the publication was Kuan-Han Sun, former post-doctorate fellow in the Department of Chemistry at the University of Pittsburgh and now in the Research Department of the Eastman Kodak Co., Rochester, N. Y.

United States Department of Commerce, Division of Simplified Practice: Permanent Committee on Simplification of Variety and Standards of Vitrified Paving Brick

C. C. BLAIR, Metropolitan Paving Brick Co., Canton, Ohio: This organization has been active compiling statistics which will be submitted in a subsequent report.

Several of the Standards Committees of the several Divisions have been active during the year, especially the White Wares Division which is continuing standardization work on ball clays under the supervision of Ralston Russell, Jr.

It is hoped that the information contained in these reports of representatives is of interest to the members of The American Ceramic Society. The members are urged to write to the representative for any additional information they may desire.

—J. W. WHITTEMORE, *Chairman*

CERAMIC EDUCATIONAL COUNCIL

REPORT OF COMMITTEE ON CONTENT OF CERAMIC COURSES

The following "Outline of Minimum Ceramic Subjects Required in a Ceramic Engineering Curriculum" was presented verbally at the Cincinnati Meeting (April, 1942) and was authorized mimeographed.

It should be particularly noted that this is an outline of subjects or topics and not an outline of courses. In some cases it may be quite desirable to use a subject as listed as the title of a course. Some of the subjects have been expanded to include a number of topics, others have been mentioned only.

At the time the outline was presented, it was recommended that particular papers be sought on the different subjects listed or that the subjects be studied by different committees.

No attempt has been made to list other scientific, cultural, humanistic, or engineering courses that would be required to make a curriculum in ceramic engineering.

—W. G. WORCESTER, J. A. PASK, H. G. SCHURECHT, R. K. HURSH, T. N. MCVAY, AND J. L. CARRUTHERS, *Chairman*

Outline of Minimum Ceramic Subjects Required in a Ceramic Engineering Curriculum

CERAMIC TECHNOLOGY SUBJECTS

(1) *Ceramic Raw Materials:* (A) *Clays*, (B) *Refractory Materials, and* (C) *Fluxes, Nonplastics, etc.*

A study of the origin, occurrence, source of supply, composition (chemical and mineralogical), impurities, beneficiation, uses, availability, and approximate market price of various materials.

(2) *Physical Properties of Ceramic Materials (in the raw, plastic, dry, and fired states)*

A study of identification properties (color, hardness, odor, etc.), plasticity, colloids, grain size, crystal structure, specific gravity (true, apparent, and bulk), viscosity, shrinkage (linear and volume), strength (modulus of rupture, tension, and compression), absorption, porosity, color, P.C.E. value, and methods of testing for properties of materials. Also, a study of the colloidal chemistry of clays, including the role of base exchange, and added electrolytes as affecting certain properties. Also, a study of the effect of added nonplastics to plastic clays in change of properties.

(3) *Drying Behavior of Ceramic Bodies*

A study of the phenomena involved and occurring during the removal of water from clays and ceramic bodies. Includes such items as diffusion of water, vapor pressures, vaporization, capillarity, surface films, and shrinkage.

(4) *Thermochemistry of Ceramic Bodies*

A study of the effect of heating on clays and clay bodies and the changes (chemical, physical, and mineralogical) taking place. Also, a study of high-temperature reactions, including the use of phase-rule diagrams for two- and three-component systems.

(5) *Ceramic Calculations*

A study of the methods used in calculating formulas, compositions, and properties of ceramic bodies, glazes, glasses, and enamels.

(6) *Glasses, Glazes, Metal Enamels, and Added Colorants*

A study of the types of glasses and various ceramic coatings, their nature, and purpose, types in each class, raw materials used (constituents), properties at maturing temperature and when cold, the nature of the glass phase, and the effect of varying composition by replacements or additions. Also, a similar study of glaze opacifiers, coloring oxides, and glaze colors.

(7) *Ceramic Bodies*

A study of the various types of ceramic bodies (structural clay, whiteware, refractory, abrasives, and cements), including their uses as commercial products, composition, properties, and specifications.

(8) *Ceramic Petrography (optional for ceramic engineering)*

A study of the use of the petrographic microscope for the examination of raw materials and products in powder and thin section to determine properties, presence of impurities, and defects and mineral composition in ceramic raw materials and products.

CERAMIC ENGINEERING SUBJECTS

(1) *Winning of Raw Materials*

A study of (*a*) geology of ceramic material deposits, (*b*) methods of locating deposits, (*c*) prospecting, (*d*) valuation, (*e*) mining methods, (*f*) beneficiation processes, (*g*) transportation, (*h*) storage of raw materials, and (*i*) economics of the mineral industries.

(2) *Ceramic Manufacturing Processes*

A study of various processing methods and equipment used for weathering, preheating, calcining, crushing, grinding, sizing, mixing, washing, filtering, tempering, forming methods, flow of clay through dies, process and product storage, and materials handling. Also, a study of the requirements of the various industries in the way of processing methods to utilize raw materials and to produce products with definite specifications.

(3) *Drying Ceramic Materials and Products*

A study of the process and the factors involved in drying ceramic products, including heat requirements, flow of gases, heat transfer, methods of heating, rates of drying, air conditioning, fans, drier control equipment, and types of drier systems.

(4) *Firing and Smelting of Ceramic Products*

A study of the requirements, techniques, and equipment used in the process, including items such as water-smoking, oxidation, vitrification, cooling, smelting, methods of heat transfer, draft, temperature and combustion control equipment, salt glazing, flashing, types of kilns, types of draft equipment, ware settings, and heat balances.

(4) (*a*) *Pyrometry*

A study of the types of pyrometer equipment, their application to ceramic processes, and the calibration of thermocouples.

(4) (*b*) *Fuels and Their Combustion*

A study of the various fuels used in ceramic firing, combustion reactions, flame temperatures, fuel calculations, combustion equipment, and the economies of fuels. (Note: Items (4) (*a*) and (4) (*b*) may be taught as separate courses in other departments but the subject matter is required in connection with Items (4) and (6)).

(5) *Utilization of Ceramic Raw Materials*

A study of various ceramic products and exercises in the use of ceramic materials for the production of bodies, glazes, glasses, enamels, and colors as used in the industry. Also includes a detailed study and correlation of the various factors entering into the manufacture of the different ceramic products.

(6) *Design of Ceramic Structures*

A study of the fundamentals of drier and kiln design, plant layout, and the selection and design of incidental equipment such as (*a*) buildings, (*b*) machinery foundations, (*c*) stacks, (*d*) fans, (*e*) structural materials and elements, (*f*) power transmission equipment, (*g*) materials handling equipment, (*h*) storage bins, and (*i*) dies.

(7) *Thesis (optional)*

A study of a chosen or assigned problem to give the student training in research methods.

CERAMIC SHOP COURSES

A course to train the students in shop and laboratory techniques. These courses might include such subjects as mold making, use of laboratory machinery, forming methods, testing methods, and use of laboratory kilns and furnaces.

INSTITUTE OF CERAMIC ENGINEERS

President: H. B. DuBois, Consolidated Feldspar Corp., Trenton, N. J.
Vice-President: R. F. Sherwood, United Feldspar & Minerals Corp., New York, N. Y.
Secretary: Karl Schwartzwalder, A C Spark Plug Co., Flint, Mich.
Past-President: H. M. Kraner, Bethlehem Steel Co., Bethlehem, Pa.
Trustee Representative: H. G. Wolfram, Porcelain Enamel & Mfg. Co., Baltimore, Md.

MINUTES OF ANNUAL MEETING

The annual meeting of the Institute of Ceramic Engineers was held in the Hotel William Penn, Pittsburgh, Pa., Wednesday, April 21, 1943, at 4:30 P.M., with President H. M. Kraner presiding. Approximately forty members were present. The Secretary-Treasurer's report of last year was accepted.

(1943)

(1) Committee on Professional Status and Development

G. J. Easter's report of this Committee was read by H. M. Kraner. Mr. Easter pointed out that professional status is what the public thinks of us and not what we may wish them to think. All of us need to become press agents and more of us should become licensed engineers. It is necessary to be a licensed engineer to become eligible for membership in the American Association of Engineers and the National Society of Professional Engineers. It was moved by J. L. Carruthers that this report be accepted. The motion was seconded by G. E. Seil and carried.

(2) Committee on Activities

J. L. Carruthers stressed the importance of more publicity for ceramic engineers. It was suggested that one or two pages of *The Bulletin* be devoted to the Institute each month and that a Publicity Committee be appointed. It was moved by G. E. Seil that the report be accepted. The motion was seconded by W. L. Fabianic and carried.

(3) Committee on State Boards of Engineering Examiners

A. F. Greaves-Walker reported that the only state which is a large producer of ceramic products that has not yet provided for licensing of ceramic engineers is West Virginia. Ceramic engineers are now licensed in twenty-six states. It was moved by C. F. Geiger that this report be accepted. The motion was seconded by W. L. Fabianic and carried.

(4) Committee on Engineers' Council for Professional Development

A. F. Greaves-Walker stated that after the war student bodies will have to be rebuilt "from scratch" and in some cases, at least, some faculty vacancies will have to be filled. During this period, close contact with the E.C.P.D. will be necessary. He suggested that members of the Institute of Ceramic Engineers should attend meetings of the other engineering societies and take an active part in their activities.

It was moved by C. E. Bales and seconded by E. H. Fritz that the Executive Committee should be given power to select members to attend meetings of different engineering societies and to contribute papers of mutual interest to these societies and The American Ceramic Society. This motion was amended by S. S. Cole requiring that the members attending these society meetings should be active in the field which the society represents and if possible should be a registered engineer in that field. The motion was carried as amended.

(5) Report of the Secretary-Treasurer

H. G. Schurecht reported that the total membership is 371, composed of 145 Charter Members, 60 Members, 134 Associate Members, and 32 Junior Members.

The balance on hand December, 1941, was $799.14. Receipts through 1942 and through March, 1943, were $2081.37. Disbursements for 1942 and 1943 were $248.07, leaving a balance of $1833.30.

Eighty-six members now owe dues for from one to five years.

The report was duly accepted.

It was moved by C. F. Geiger that the Executive Committee be given power to limit the time during which dues must be paid. The motion was seconded by G. E. Seil and carried.

(6) The President's Report

President H. M. Kraner suggested that our number one problem is to publicize the breadth of ceramic engineering among other engineering societies and the general public. He proposed that we cooperate with other engineering groups toward this end and that we form four subcommittees under the Professional Status Committee to take care of all phases of such publicity. Mr. Kraner also suggested that copies of certain papers from the publications of The American Ceramic Society could be sent complimentary to members of other engineering societies as a means of bringing our name before other engineering groups.

(7) Committee on Ceramic Engineering Education

The importance of postwar readjustment was stressed by Chairman R. M. Campbell. It was recommended that the Committee create a ceramic engineering pool to help men secure positions in their respective fields. It was further recommended that an explanatory letter together with a short questionnaire be sent to (1) the present men in service or at the moment out of ceramic work, (2) the industrial and the technical employers of ceramic engineers, and (3) the ceramic colleges.

It was moved by J. L. Carruthers that this report be accepted. This was seconded by C. M. Dodd and carried.

(8) Election of Nominating Committee

In accordance with the Rules of the Institute five members were elected to the Nominating Committee by secret ballot, namely, Robert Twells, R. F. Geller, C. F. Geiger, Frederick Heath, Jr., and Paul G. Herold.

(9) Committee on Membership and Examinations

A. S. Watts reported that it was decided to delay action on all membership applications received after March 1 in view of the changes to be made in membership rules this year.

It was moved by R. K. Hursh that the report be accepted. This was duly seconded and carried.

(10) Committee on Rules

M. F. Beecher reported that a meeting was held on April 20 with ten members of the Membership and Executive Committees present, and the revised Rules were approved by all present. A. F. Greaves-Walker asked that the word "approved" be changed to "accredited" in several places.

It was moved by C. M. Dodd that the revised Rules be accepted. This was seconded by A. F. Greaves-Walker and carried.

(11) Installation of Officers

The following officers for 1943–1944 were installed:

President: H. B. DuBois, Consolidated Feldspar Corp., Trenton, N. J.
Vice-President: R. F. Sherwood, United Feldspar & Minerals Corp., New York, N. Y.
Secretary-Treasurer: Karl Schwartzwalder, A C Spark Plug Co., Flint, Mich.

—H. G. Schurecht, *Secretary-Treasurer*

REPORT OF SECRETARY-TREASURER

The principal duties of the Secretary-Treasurer for the past year have been in connection with membership applications.

Since the Institute has been organized, the Membership and Examinations Committee and the Executive Committee have handed down decisions on applications which resulted in the following:

Advancements: From Associate to Member 7; from Junior to Associate 24. *Rejections for Advancement:* From Associate to Member 5. *Rejections for Membership in the Institute:* 34.

We have lost 38 members, of which 23 resigned and 7 were deceased.

We now have 371 members, as follows: Charter 145, Member 60, Associate 134, and Junior 32.

A letter was sent to all members who resigned to determine why they had resigned. It was found that all who resigned had either entered active military service or had left the ceramic industry. All expressed their intention of coming back into the Institute when they again become active in ceramics.

Five members owe dues for 1939–1943, 2 for 1940–1943, 12 for 1941–1943, 11 for 1942–1943, 53 for 1943, 1 for 1942 only, and 1 for 1941–1942; 1 refuses to pay Institute assessments; 285 have paid in full.

Treasurer's Report

Balance, December, 1941		$ 799.14
Receipts through December, 1942		711.98
Receipts through March, 1943		570.25
		$2081.37
Disbursements, 1942	$167.35	
Disbursements, 1943	80.72	248.07
		$1833.30

—H. G. Schurecht, *Secretary-Treasurer*

Personal Energy
Is Necessary for Success

Energy to Reason and Work
Is Necessary in Ceramics

REPORT OF COMMITTEE ON PATENTS

Upon the adjournment of the Second Session of the Seventy-Seventh Congress in December, 1942, all legislation then pending expired. Little time has been available to analyze legislation that has been introduced into the present session, and, although some bills of importance have been introduced, the Committee believes that at the present moment it should concern itself more with trends than with specific proposed legislation.

The public is today more aware of invention and patents than probably ever before. This is due in large measure to the recent and continuing attacks upon the patent system as exemplified, for example, by the hearings conducted by the Department of Justice last year in connection with S. 2303. The ends sought by these attacks would effectively destroy our patent system with inevitable far-reaching detriment to our national economy and welfare. Had S. 2303 been enacted into the law it would have been possible for the President, or his appointee, to grant licenses to anyone under any patent or group of patents upon such terms and for such period of time as he might prescribe, or to seize any patent or any groups of patents by merely filing a declaration to that effect, and to issue licenses thereunder. Although designated a war measure, no restriction was placed by the bill upon the duration of such licenses or for the retention of a license by a party whose patents might be seized. The effect of such a law upon our patent system will be obvious.

This and other bills and the tactics that have been employed in connection with them reflect a serious intent to weaken our patent system despite the fact that impartial observers are decisively of the view that its results have been beneficial to our national economy and welfare. We believe that beyond question the industrial and economic welfare and progress of our country have been directly due to the creation of a strong patent system under a wise constitutional provision, a system that has encouraged invention, investment in research productive of invention, and investment in developing and commercializing inventions. In his book entitled March of the Iron Men, Roger Burlingame has demonstrated with certainty that during the period ending with the Civil War American society became converted from an agricultural society to an industrial nation as the result of invention, and that this conversion from a society into a nation was not the result of "wars, treaties, or what is called politicial science." In his later book, Engines of Democracy, the author shows how invention has affected the nation and our daily life since that period, and the same conclusion can be drawn. Every phase of our daily life is inextricably linked with the fruits of invention. What we enjoy today, not only in technology but also in the arts, would largely be lacking were it not for a patent system that fundamentally has acted as an incentive to invention and investment, has stood the test of time, and has been one of the leading factors in changing our country during approximately 150 years from a new land to a nation leading all others in technical and economic advancement.

The Committee believes that it is no exaggeration to say that the tremendous showing made by our country in production for the war effort would have been absolutely impossible were it not for having encouraged invention through our patent system.

It is recognized that patents have in some instances been misused, but the Committee believes sincerely that our patent system is fundamentally sound, that it should be strengthened rather than weakened or destroyed, and that such criticism as has been advanced can be eliminated to that end by clarification and proper administration of the antitrust laws and by a few changes in patent law and practice that will act for the public benefit.

In December, 1941, President Roosevelt created the National Patents Planning Commission, composed of C. F. Kettering, C. C. Davis, Owen D. Young, F. P. Gaines, and E. F. McGrady. That committee is charged with conducting a comprehensive survey of our patent system to determine whether it needs change and, if so, in what way. This committee has been devoting much time to its problem and is earnestly and sympathetically seeking to do what is best.

Of course, invention will never stop, but the weakening of our patent system will inevitably resolve itself into elimination of much research and of many inventions that would otherwise result, because invention today is largely collective and requires large investment. Without strong patent protection it would have been impossible to create a multitude of new industries on which progress in every field of endeavor from technology to the humanities depends. Weaken the patent system and future similar progress will be hampered or not attained. These attacks on the patent system thus affect The American Ceramic Society and its members individually.

The Committee believes that The Society can best serve in connection with the patent system by presenting the substance of the foregoing views to the National Patents Planning Commission, suggesting to that body a few reforms that will nullify existing criticism and offer to cooperate otherwise with the Commission to the end that our patent system may be strengthened and preserved.

Specifically, it is recommended that the attention of the Commission and of the appropriate committees of Congress be called to the following proposals.

To Remedy So-Called Abuses

(1) No legislation should be enacted which would in any way interfere with the freedom of a patent owner in licensing others.

COMMENTS: Although in rare instances license restrictions may not have acted for the public benefit, all possible abuses can be treated under the antitrust laws, but we recognize that this may necessitate legislation defining the rights and liabilities of patentees, especially with regard to the antitrust laws. No reason is evident why patent property should be treated any differently from other forms of property in this respect.

(2) The patent statutes should be amended to provide that a patent will expire twenty years after the filing of the application, with a maximum life of seventeen years.

COMMENTS: This will avoid the so-called long-pending application evil.

(3) No law providing for compulsory licensing should be enacted.

COMMENTS: Compulsory licensing has been proposed many times, but the Congressional hearings on such bills have shown conclusively that the result would be the reverse of that proposed by the proponents of compulsory licensing. The owner of real property may use it or not, as he sees fit. Why should patents be treated in a different manner? The public has its reward and benefit through disclosure of the patented invention, and weakening of the patent system by compulsory licensing or otherwise will act to cause secret practice of inventions, with resultant public disadvantage.

(4) A single Court of Patent Appeals should be created.

COMMENTS: Much of the confusion and criticism that now exists is due to diversity of opinion and statute construction among the Circuit Courts of Appeals, and the Courts themselves have from time to time indicated difficulty in dealing with patent appeals. A single court specializing in patent appeals would go far toward eliminating many existing criticisms.

(5) Disclaimers should be abolished.

COMMENTS: Everything accomplished by disclaimer can be accomplished by reissue.

To Simplify Practice Before the Patent Office

(6) Interference practice should be simplified and shortened.

COMMENTS: This would avoid criticism of the twenty-year proposal. Interferences might even be abolished in the Patent Office, the patent being granted to the first applicant. The second applicant might then resort to R.S. 4915, or, upon a showing by the second applicant overcoming the filing date of the patentee, a patent might be granted to him and priority determined under R.S. 4918.

(7) The patent statutes should be amended to permit the filing of true divisional and reissue applications by an assignee of record.

—F. H. RIDDLE, J. C. HOSTETTER, AND FULTON B. FLICK, *Chairman*

REPORT OF COMMITTEE ON RULES*

To accomplish the changes requested by the Board of Trustees in regard to the changed method of nominating the officers of The Society and to create the new standing Committee on Classification and Nomenclature, the Committee on Rules herewith submits its recommendations.

Add to the Rules of The Society the following new Section:

ARTICLE R VII: "(1) (*a*) To facilitate selecting nominees for President, Vice-President, and Treasurer of THE SOCIETY, the incoming President may, promptly after the Annual Meeting at which he takes office, appoint a Trustees' Nominating Committee of three from the members of the Board or Past-Presidents of THE SOCIETY. It shall be the duty of this Committee to make confidential recommendations to the Trustees together with available biographical data on the proposed candidates.

"(*b*) The President should transmit to the Trustees' Nominating Committee the names of all suggested candidates he may receive from the membership of THE SOCIETY."

Amend the By-Laws as follows:

Change the heading of Article B IV to read "Board of Trustees" and renumber the present three (3) paragraphs (3) (*a*), (*b*), and (*c*).

Add a new Section as follows:

"(2) The term of office of a Trustee representative of a Class or of a Division shall end immediately upon his election as President, Vice-President, or Treasurer of THE SOCIETY."

Change Article B VII, Section (5), to read as follows:

"(5) (*a*) In the event of election as President, Vice-President, or Treasurer of THE SOCIETY or in the event of refusal to act, incapacity to act, or the resignation of a Trustee representative of a Class, a successor may be appointed by the officers of said Class to serve until the next Annual Meeting, at which time the members of such Class shall elect a successor to fill the unexpired term, if any remains, as provided in the Rules of such Class not inconsistent with the Constitution and By-Laws.

"(*b*) In the event of election as President, Vice-President, or Treasurer of THE SOCIETY, or in the event of refusal to act, incapacity to act, or resignation of a Trustee representative of a Division, a successor may be appointed to serve until the next Annual Meeting, at which time the members of such Division shall elect a successor to fill the unexpired term, if any, as provided in the Rules of such Division not inconsistent with the Constitution and By-Laws."

Amend Article B XII, Section (1) (*h*), by deleting the word "Data" and substituting therefor the words "Classification and Nomenclature."

Amend Article B XII, Section (9), by deleting the entire present Section and substituting therefor the following:

"(9) The Committee on Classification and Nomenclature shall consist of the Chairman of the Classification and Nomenclature Committees of those Divisions having such a committee. The Chairman shall be appointed by the Board of Trustees. It shall act in an advisory capacity to the Board of Trustees and shall endeavor to develop a uniform classification and nomenclature for the ceramic industry."

The Refractories Division is amending Article RR VII, Section (1), to make it consistent with the changed method of nominating The Society's officers.

The Structural Clay Products Division is in the process of adopting a complete new set of Rules.

The Institute of Ceramic Engineers is amending Article EIR III on Membership restating entrance requirements for the several grades of its membership.

Now that former Nominating Committees A and B are no longer in existence, it will be necessary for all Divisions and Classes, who have not already done so, to amend their Rules to make them consistent with the new setup. We suggest that the new Committee on Rules promote these changes.

—W. KEITH MCAFEE, *Chairman*

ADJUSTMENTS IN GLASS DIVISION RULES†

Article GR IV. Government

(1) and (2) Delete the word "First" preceding "Vice-Chairman" and delete the words "Second Vice-Chairman."

(3) Delete the word "Second" preceding "Vice-Chairman."

Article GR VI. Officers

(2) Delete the word "First" preceding "Vice-Chairman."

(4) Delete entire Section relating to Second Vice-Chairman.

Article GR VII. Nominations and Elections

(1) Delete entire Section relating to Nominating Committees A and B.

(2) Change numbering from (2) to (1). Delete the word "First" preceding "Vice-Chairman" and delete the words "Second Vice-Chairman."

(3) Change numbering from (3) to (2).

Article GR XII. Committees

(6) Substitute "Vice-Chairman" for "First and Second Vice-Chairmen."

These changes abolish provisions for the obsolete Society Nominating Committees A and B and the office of Second Vice-Chairman and rename the First Vice-Chairman simply Vice-Chairman.

The numbering of Section (5) of Article GR VI, Officers, is to be retained.

† For Proposed Glass Division Rules and Rules as adopted see January and June, 1939, *Bulletins*, pp. 22 and 216, respectively.

Ceramists Must Be Frugal
Resources Must Be Conserved

Postwar Security Depends on
Investments in Research
And Fullest Possible Cooperation
With Fellow Ceramists

* For Society Rules and By-Laws see October, 1938, *Bulletin*.

STANDING COMMITTEES FOR 1943–1944

Executive Committee, Board of Trustees

C. E. BALES (*ex-officio*): Ironton Fire Brick Co., Ironton, Ohio
L. J. TROSTEL: General Refractories Co., Baltimore, Md.
E. H. FRITZ: Stupakoff Ceramic & Mfg. Co., Latrobe, Pa.
R. L. FELLOWS: Chicago Vitreous Enamel Product Co., Cicero, Ill.
J. W. WHITTEMORE: Virginia Polytechnic Institute, Blacksburg, Va.

Finance Committee, Board of Trustees

E. H. FRITZ, *Chairman:* Stupakoff Ceramic & Mfg. Co., Latrobe, Pa.
J. B. AUSTIN: U. S. Steel Corp., Kearny, N. J.
C. FORREST TEFFT: Claycraft Co., Columbus, Ohio

Public Relations Committee

V. V. KELSEY, *Chairman:* Dominion Minerals, Inc., Shoreham Bldg., Washington, D. C.
F. C. FLINT: Hazel-Atlas Glass Co., Washington, Pa.
H. M. KRANER: Bethlehem Steel Co., Bethlehem, Pa.
A. A. WELLS: Homer Laughlin China Co., Newell, W. Va.

Committee on Rules

W. KEITH MCAFEE, *Chairman:* Universal Sanitary Mfg. Co., New Castle, Pa. (assisted by the Chairman of the Rules Committee of each Class and Division)

Committee on Publications

J. D. SULLIVAN, *Chairman:* Battelle Memorial Institute, Columbus, Ohio
H. H. BLAU: Federal Glass Co., Columbus, Ohio
R. L. STONE: Univ. of North Carolina, Raleigh Unit, Raleigh, N. C.
J. J. CANFIELD: American Rolling Mill Co., Middletown, Ohio
HARRY THIEMECKE: Homer Laughlin China Co., Newell, W. Va.
R. C. PURDY (*ex-officio*): The American Ceramic Society, Inc., Columbus, Ohio

Committee on Membership

RALSTON RUSSELL, JR., *Chairman:* Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. (assisted by the Chairman of the Membership Committee of each Class and Division)

Committee on Standards

J. W. WHITTEMORE, *Chairman:* Virginia Polytechnic Institute, Blacksburg, Va. (assisted by members of the Standards Committee of each Class and Division)

Committee on Sections and Divisions

A. I. ANDREWS, *Chairman:* University of Illinois, Urbana, Ill.
E. P. POSTE: 309 McCallie Ave., Chattanooga, Tenn.
E. E. MARBAKER: Mellon Institute, Pittsburgh, Pa.
D. G. BENNETT: Mellon Institute, Pittsburgh, Pa.
E. P. MCNAMARA: Rutgers University, New Brunswick, N. J.
R. S. BRADLEY: A. P. Green Fire Brick Co., Mexico, Mo. (assisted by the Chairman of each Division and Section)

Committee on Research

A. A. WELLS, *Chairman:* Homer Laughlin China Co., Newell, W. Va. (assisted by the Chairman of the Research Committee of each Class and Division)

Committee on Geological Surveys

H. RIES, *Chairman:* 401 Thurston Ave., Ithaca, N. Y.
J. E. LAMAR: State Geology Div., Univ. of Illinois, Urbana, Ill.
O. C. RALSTON: Nonmetals Div., U. S. Bureau of Mines, College Park, Md.
F. K. PENCE: Univ. of Texas, Div. of Industrial Chemistry, Austin, Tex.
HEWITT WILSON: Electrotechnical Lab., U. S. Bureau of Mines, Norris, Tenn.
NORMAN PLUMMER: State Geological Survey of Kansas, Lawrence, Kans.
A. F. GREAVES-WALKER: Office of Production Research & Development, War Production Board, Washington, D. C.

Committee on Classification and Nomenclature

Chairman plus Division representatives
(Chairman to be announted later)

Committee on Ceramic Education

H. M. KRANER, *Chairman:* Bethlehem Steel Co., Bethlehem, Pa. (Engineering Member, 4 years)
G. J. EASTER: Carborundum Co., Niagara Falls, N. Y. (Industry Member, 1 year)
J. S. GREGORIUS: Pittsburgh Plate Glass Co., Creighton, Pa. (Technology Member, 2 years)
ALICE A. AYARS: 12479 Cedar Rd., Cleveland Heights, Ohio (Art Member, 3 years)
R. M. KING: Ohio State University, Columbus, Ohio (Education Member, 5 years)

Committee on Industrial Management

W. KEITH MCAFEE, *Chairman:* Universal Sanitary Mfg. Co., New Castle, Pa. (assisted by a member from each Division)

Committee on Patents

F. B. FLICK, *Chairman:* 1706 First National Bank Bldg., Pittsburgh, Pa.
C. F. GEIGER: Carborundum Co., Perth Amboy, N. J.
F. H. RIDDLE: Champion Spark Plug Co., Detroit, Mich.

Committee on Film Library

H. E. SIMPSON, *Chairman:* Mellon Institute, Pittsburgh, Pa.
C. R. AUSTIN: Battelle Memorial Institute, Columbus, Ohio
R. C. Purdy: The American Ceramic Society, Inc., Columbus, Ohio

Committee on Air Hygiene

F. C. FLINT, *Chairman:* Hazel-Atlas Glass Co., Washington, Pa.
EDWARD SCHRAMM: Onondaga Pottery Co., Syracuse, N. Y.
V. P. AHEARN: National Industrial Sand Assn., 951 Munsey Bldg., Washington, D. C.
L. H. MILLIGAN: Norton Co., Worcester, Mass.
F. A. HARVEY: Harbison-Walker Refractories Co., Pittsburgh, Pa.

SPECIAL COMMITTEES

Committee for the Art Division

W. A. WELDON, *Chairman:* Locke Insulator Corp., Baltimore, Md.
W. KEITH MCAFEE: Universal Sanitary Mfg. Co., New Castle, Pa.
V. V. KELSEY: Dominion Minerals, Inc., Shoreham Bldg., Washington, D. C.
F. C. FLINT: Hazel-Atlas Glass Co., Washington, Pa.
A. A. WELLS: Homer Laughlin China Co., Newell, W. Va.
R. A. WEAVER: Ferro Enamel Corp., Cleveland, Ohio
R. E. JORDAN: Mosaic Tile Co., Matawan, N. J.

Committee on Associate Secretary

J. D. SULLIVAN, *Chairman:* Battelle Memorial Institute, Columbus, Ohio
L. J. TROSTEL: General Refractories Co., Baltimore, Md.
J. E. HANSEN: Ferro Enamel Corp., Cleveland, Ohio
D. E. SHARP: Hartford-Empire Co., Hartford, Conn.
R. C. PURDY: The American Ceramic Society, Inc., Columbus, Ohio

Committee on Status of Ceramic Engineers with Selective Service Boards

A. I. ANDREWS, *Chairman:* University of Illinois, Urbana, Ill.
M. E. HOLMES: New York State College of Ceramics, Alfred, N. Y.
J. E. EAGLE: War Production Board, 221 Eighth St., S. W., Washington, D. C.
A. S. WATTS: Ohio State University, Columbus, Ohio
V. V. KELSEY: Dominion Minerals, Inc., Shoreham Bldg., Washington, D. C.
H. B. DUBOIS: Consolidated Feldspar Corp., Trenton, N. J.
H. M. KRANER: Bethlehem Steel Co., Bethlehem, Pa.

APPOINTED REPRESENTATIVES FOR 1943–1944

American Association for the Advancement of Science

R. C. PURDY: The American Ceramic Society, Inc., Columbus, Ohio

American Foundrymen's Association

L. C. HEWITT: Laclede-Christy Clay Products Co., St. Louis, Mo.

American Society for Testing Materials

Committee A–1 on Steel: H. F. STALEY, Metal & Thermit Corp., 120 Broadway, New York, N. Y.
Committee C–6 on Drain Tile: J. L. CHILD, Hancock Brick & Tile Co., Findlay, Ohio
Committee C–7 on Lime: C. R. AUSTIN, Battelle Memorial Institute, Columbus, Ohio
Committee C–8 on Refractories: J. W. WHITTEMORE, Virginia Polytechnic Institute, Blacksburg, Va.
Committee C–11 on Gypsum: H. E. SIMPSON, Mellon Institute, Pittsburgh, Pa.
Committee C–14 on Glass and Glass Products: G. W. MOREY, Geophysical Laboratory, Washington, D. C.
Committee C–15 on Manufactured Masonry Units: J. W. WHITTEMORE, Virginia Polytechnic Institute, Blacksburg, Va.
Committee D–3 on Gaseous Fuels: C. H. PARMELEE, Onondaga Pottery Co., Syracuse, N. Y.
Committee D–5 on Coal and Coke: A. W. GAUGER, Pennsylvania State College, State College, Pa.
Committee D–9 on Electrical Insulating Materials: L. E. BARRINGER, General Electric Co., Schenectady, N. Y.

American Society of Mechanical Engineers

Petroleum Division: H. R. STRAIGHT, Straight Engineering Co., Adel, Iowa
Process Division: W. KEITH MCAFEE, Universal Sanitary Mfg. Co., New Castle, Pa.

American Standards Association

Sectional Committee on Specifications for Drain Tile (Project A–6): J. L. CHILD, Hancock Brick & Tile Co., Findlay, Ohio
Sectional Committee on Minimum Requirements for Plumbing and Standardization of Plumbing Equipment (Project A–40): HARRY WHITTAKER, Crane Co., Chicago, Ill.
Sectional Committee on Recommended Practice for Brick Masonry (Project A–41): J. W. WHITTEMORE, Virginia Polytechnic Institute. Blacksburg, Va.
Sectional Committee on Coordination of Dimensions of Building Materials and Equipment (Project A–62): FREDERICK HEATH, JR., Owens-Corning Fiberglas Corp., Toledo, Ohio
Sectional Committee on Insulators for Electric Power Lines (Project C–29): G. W. LAPP, Lapp Insulator Co., Le Roy, N. Y.
Sectional Committee on Scientific and Engineering Symbols and Abbreviations (Project Z–10): RALSTON RUSSELL, JR., Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Sectional Committee on Specifications for Sieves for Testing Purposes (Project Z–23): A. S. WATTS, Ohio State University, Columbus, Ohio
Sectional Committee on Specifications and Methods of Test for Safety Glass (Project Z–26): GEORGE WATKINS, Libbey-Owens-Ford Glass Co., Toledo, Ohio; D. E. SHARP (alternate), Hartford-Empire Co., Hartford, Conn.

International Association for Testing Materials

S. M. PHELPS: Mellon Institute, Pittsburgh, Pa.

International Commission on Glass Technology

J. C. HOSTETTER: Hartford-Empire Co., Hartford, Conn.

International Chemical Congress

ALEXANDER SILVERMAN: University of Pittsburgh, Pittsburgh, Pa.

Inter-Society Color Council

I. A. BALINKIN, *Chairman:* University of Cincinnati, Cincinnati, Ohio
R. S. HUNTER: National Bureau of Standards, Washington, D. C.
CAMPBELL ROBERTSON: E. I. du Pont de Nemours & Co., Inc., Perth Amboy, N. J.
A. S. WATTS: Ohio State University, Columbus, Ohio
WOLDEMAR WEYL: Pennsylvania State College, State College, Pa.
EDWARD SCHRAMM: Onondaga Pottery Co., Syracuse, N. Y.
H. D. CALLAHAN: U. S. Quarry Tile Co., East Sparta, Ohio
W. E. DOUGHERTY: O. Hommel Co., Pittsburgh, Pa.
N. J. KREIDL: Bausch & Lomb Optical Co., Rochester, N. Y.
L. H. MILLIGAN: Norton Co., Worcester, Mass.
V. H. REMINGTON: B. F. Drakenfeld & Co., Washington, Pa.

Illuminating Engineering Society and Luminous Glassware Guild

W. C. TAYLOR, *Chairman:* Corning Glass Works, Corning, N. Y.

R. A. MILLER: Pittsburgh Plate Glass Co., Pittsburgh, Pa.

R. R. SHIVELY: B. F. Drakenfeld & Co., Inc., Washington, Pa.

H. H. BLAU: Federal Glass Co., Columbus, Ohio

National Research Council

Division of Geology and Geography: G. W. MOREY, Geophysical Laboratory, Washington, D. C.

Division of Chemistry and Chemical Technology: G. W. MOREY

Orton Foundation Board

L. E. BARRINGER: General Electric Co., Schenectady, N. Y.

United States Department of Commerce, Division of Simplified Practice; Permanent Committee on Simplification of Variety and Standards of Vitrified Paving Brick

C. C. BLAIR: Metropolitan Paving Brick Co., Canton, Ohio

FORTY-FIFTH ANNUAL MEETING INCOME AND EXPENSES

INCOME

Registration	$4871.50	
Refractories luncheon	138.00	
Structural Clay Products luncheon	52.50	
White Wares luncheon	96.00	
University Club (ladies)	93.25	
Planetarium trip (ladies)	20.00	$5271.25

EXPENSES

Badges		$ 91.00	
Lettering signs		7.96	
Long-distance calls		52.52	
Telegrams		68.45	
Postage		43.07	
Registration lists expense		18.04	
Printing programs, reprints, and preprints		1388.17	
Printing registration cards		23.18	
Express		17.84	
Extra help for registration		80.00	
Lettering badges		40.00	
Publicity for Meeting		5.00	
Rental public address system		30.00	
General Secretary and office staff expenses		397.96	
Projection of slides		2.00	
Rental on balopticans		25.00	
Board of Trustees luncheon		73.50	
Local Committee			
Magician	$300.00		
Preparing Ball Room for Night of Magic	28.70		
Printing ladies' programs and tickets	20.74		
University Club (ladies)	96.25		
Music (Sunday night reception)	40.00		
Miscellaneous for bridge party	4.40		
Car service for ladies	7.50		
Planetarium trip (ladies)	16.80		
Sunday night reception	270.00		
Orchestra (Monday night)	150.00	934.39	
Camera Club (preparing rooms for exhibits)		14.00	
White Wares luncheon		96.00	
Structural Clay Products luncheon		52.50	
Refractories luncheon		138.00	
Service boys		144.00	
Pinkerton Detective Agency		112.00	
Hauling Silverman exhibits		5.00	
Reporting (Mrs. Ely)		237.50	
Hotel boys (service charges)		24.80	
Blackboard erasers		1.55	
Unaccounted expense		5.50	$4128.93
			$1142.32

REGISTRATION ATTENDANCE

705 members at $5.00	$3525.00
152 nonmembers at $7.50	1140.00
83 students at $1.50	124.50
82 ladies at $1.00	82.00
1022	$4871.50
24 complimentary	
1046	

ADDITIONS TO EXHIBITS IN AMERICAN CERAMIC SOCIETY HEADQUARTERS

Solid Crystal Glass Bust

Frederick Carder of the Steuben Division of the Corning Glass Works has presented The Society with a seven-inch bust of General Secretary Ross C. Purdy. All in one piece, the head is on a glass base and backed by a glass panel. It is an excellent likeness.

The process of casting, in solid glass, of objects with heavy undercuts is an art developed by Mr. Carder. This figure likeness of our Ross cannot be reproduced except by Fred Carder's starting with an original modeling in clay and carrying it through the several moldmaking steps that result finally in a solid refractory mold into which glass can be poured.

Meeting Badges

One of the most appreciated additions to The Society's exhibits is one of the badges made by Dr. Arthur E. Baggs and his staff in the Ceramic Art Division of the Department of Fine Arts at Ohio State University. Having a porcelain badge was an innovation greatly appreciated by the 1046 persons who registered at the Forty-Fifth Annual Meeting at the Hotel William Penn in Pittsburgh the week of April 18. It is equally appreciated as a permanent exhibit in The Society's offices.

Lotus Vase

Joseph P. Thorley presented The Society with a beautiful example of lotus ware made in bone china. Its only decoration is a molded crimp on the edge of the vase.

Glass Beads and Shards Collected by Walter J. Sparks near Williamsburg, Va.

This collection in a case was presented by Francis C. Flint. It is of historical interest and will be preserved as a record of the earliest glassmaking in America.

Two Catalina Vases

One eight-inch vase in copper oxblood red and another one in Persian blue have been presented to The Society by Gladding, McBean & Co. These vases are exceptional in design and in glaze characteristics. They show glazes like unto those made by the Chinese and supposedly not producible by modern ceramists. Here they are, not costly museum pieces but mass-produced, low-cost ceramic art pieces.

PERSONAL NOTES

Joseph F. Greene
Chairman, Glass Division

DWIGHT GRANVILLE BENNETT

Chairman, Enamel Division

Biography

Dwight Granville Bennett was born October 1, 1894, in Mt. Carroll, Ill. He attended the Mt. Carroll grade and high schools and in 1930 received the B.S. degree in Ceramic Engineering from the University of Illinois, Urbana, Ill. For one year following his graduation, he was employed by the Metal & Thermit Corp., Rahway, N. J., to carry out development work on enamels.

At the present time, Mr. Bennett is Industrial Fellow at the Mellon Institute of Industrial Research, Pittsburgh, Pa., where he is engaged in the development and testing of enamel ground-coat adherence and enamel surface and body strength.

Society Activities

Mr. Bennett has been a member of The American Ceramic Society since 1930 and a Fellow since 1941. He has served successively as Chairman of the Enamel Division Committee on Tests, 1934–1936; Chairman of the Pittsburgh Section, 1938–1939; Chairman of The Society Committee on Data, 1938–1940; and Secretary of the Enamel Division, 1938–1941.

He is also a member of Sigma Xi and Tau Beta Pi.

Publications

(1) "Control of Draining Consistencies of Enamel by Addition of Sodium Silicate," *Jour. Amer. Ceram. Soc.*, **14** [7] 490–94 (1931).

(2) (With A. I. Andrews) "Systematic Study of Sheet-Iron Cover Enamels," *ibid.*, [8] 590–602.

Dwight Granville Bennett

Stephen McKee Swain

STEPHEN McKEE SWAIN

Secretary, Refractories Division

Stephen McKee Swain was born July 22, 1903, in Hornell, N. Y. He attended the Hornell grade and high schools and in 1925 was graduated with the B.S. degree in Ceramic Engineering from the New York State College of Ceramics, Alfred, N. Y.

From July, 1925, to July, 1929, Mr. Swain was Junior Fellow on the Refractories Fellowship at the Mellon Institute of Industrial Research, Pittsburgh, Pa., where he tested refractories, developed tests, and studied the properties of refractories. From July, 1929, to December, 1934, he was ceramic engineer for the Kier Fire Brick Co. (later the General Refractories Co.), Salina, Pa., where he was engaged in the investigation of manufacturing processes and was supervisor of the Hand Molding Department.

In December, 1934, Mr. Swain became associated with the North American Refractories Co., Cleveland, Ohio, where as ceramic engineer he was responsible for the coordination of technical work and the determination of the technical applications of refractories. He was appointed to his present position of Director of Research in July, 1940.

Among Mr. Swain's significant achievements is the development of the present form of A.S.T.M. panel spalling test equipment and procedure.

Mr. Swain became a member of The American Ceramic Society in 1925 and was elected to the Fellowship in 1937. He has served the Refractories Division as a member of the Committee on Papers and Program, 1929–1930 and 1941–1943 (Chairman, 1942–1943); Committee on Standards and Tests, 1932–1934; and Committee on Membership, 1937–1938.

He is also a member of the Institute of Ceramic Engineers, Committee C–8 of A.S.T.M, and Eta Mu Alpha.

Publications

(1) (With S. M. Phelps and R. F. Ferguson) "Service Spalling Test for Refractories," *Jour. Amer. Ceram. Soc.*, **14** [5] 389–402 (1931).

(2) (With S. M. Phelps) "Proportioning Grain Size in Clay Refractories," *ibid.*, [12] 884–98.

(3) "Symposium on Control Testing in Clay Firebrick Manufacture: VI, Control Tests for Moisture in Fire Clay and Fire-Clay Bodies," *Bull. Amer. Ceram. Soc.*, **11** [7] 175–78 (1932).

(4) "Superduty Fire-Clay Brick," *Amer. Refrac. Inst. Tech. Bull.*, No. 76.

EDWARD CARLETON HENRY

Secretary, Ceramic Educational Council

Edward Carleton Henry was born in Philadelphia, Pa., May 30, 1905. He was graduated from Rutgers University in 1926 with the degree of B.Sc. in Ceramics and remained at Rutgers for two years as instructor and research assistant. He then attended the Mackay School of Mines, University of Nevada, Reno, Nevada, where he took courses in mineralogy, petrology, geology, and mining leading to the degree of M.S. in Mining Geology. After remaining in Nevada for several years as superintendent of mining operations for an investment organization, he returned to the Ceramics Department at Rutgers and served as instructor and senior research fellow from 1932 to 1935. Transferring to The Pennsylvania State College, he received the Ph.D. degree in 1936 and the degree of Cer.E. in 1941.

In September, 1936, Dr. Henry was appointed research assistant at The Pennsylvania State College and engaged in technical research sponsored by the Findlay Clay Products Co., of Washington, Pa. He was advanced to assistant professor of ceramic engineering in 1938 and to associate professor in 1941. His recent researches have been in the field of mineral colloids.

Dr. Henry became a member of The American Ceramic Society in 1926. He is also a member of the American

Edward Carleton Henry

Institute of Mining and Metallurgical Engineers, the Institute of Ceramic Engineers, the Pennsylvania Academy of Science, the American Association of University Professors, Sigma Xi, Phi Kappa Phi, Phi Lambda Upsilon, and Sigma Gamma Epsilon and is registered as a Professional Engineer in Pennsylvania.

Publications

(1) "Making Your Clays More Plastic," *Ceram. Age*, **21** [2] 42 (1933).

(2) (With N. W. Taylor) "Acid- and Base-Binding Capacities and Viscosity Relations in Certain Whiteware Clays," *Jour. Amer. Ceram. Soc.*, **21** [5] 165–75 (1938).

(3) "Comparative Study of Acid- and Base-Binding Capacities and Viscosity Relations in (A) and (B) Clays," *ibid.*, **22** [7] 207–10 (1939).

(4) "Applications of Colloid Science in the Ceramic Industry," *Proc. Penna. Acad. Sci.*, **14**, 126–29(1940).

(5) "Instruction and Research in Mineral Colloids," *Mineral Ind.*, **10**[3] 1–3, 1940; *Ceram. Age*, **37**[1] 9–10 (1941).

(6) "Increasing Importance of Mineral Colloids," *The Compass of Sigma Gamma Epsilon*, **21** [3] 211–14 (1941).

(7) (With A. C. Siefert) "Plastic and Drying Properties of Certain Clays as Influenced by Electrolyte Content," *Jour. Amer. Ceram. Soc.*, **24** [9] 281–85 (1941).

(8) "Study Made of Clay Molding," *Mineral Ind.*, **11** [1] 1–3 (1941).

(9) "Measuring Workability of Clay Bodies," *Ceram. Ind.*, **38** [3] 72–74 (1942).

(10) "Flocculation and Deflocculation of Mineral Colloids," *Proc. Pan-American Congr. Mining Eng. Geol., First Congr., 1942.*

(11) "Measurement of Workability of Ceramic Bodies for Plastic Molding Processes," *Jour. Amer. Ceram. Soc.*, **26** [1] 37–39 (1943).

(12) (With Lane Mitchell) "Nature of Georgia Kaolin: I, Evidence of Chemical and Colloidal Analysis," *ibid.*, [4] 105–13; "II, Evidence of Mineralogical Analysis," *ibid.*, pp. 113–19.

PRESENTATION OF ALLEN PERCIVAL GREEN FOR THE HONORARY DEGREE OF DOCTOR OF SCIENCE

By Major E. Holmes, Dean, New York State College of Ceramics

Mr. President:

Alfred University, engaged as it is in ceramic education through the medium of its Ceramic College, highly prizes its privilege of conferring the honorary degree of Doctor of Science upon individuals who, through the medium of ceramic engineering, attain a position of outstanding national distinction. We have as our guest today the twelfth person in the 104 years of Alfred University's existence to win this specific high honor. In accordance with established practice I shall present a record of his career.

He was born at Jefferson City, Mo., and has spent most of his life in that State. He was educated in the Sedalia, Mo., High School, private tutorial schools, and the University of Missouri School of Mines and Metallurgy, Rolla, Mo. After spending several years in general engineering work in the Midwest, he became a Director and General Sales Manager of the Harbison-Walker Refractories Co., Pittsburgh, Pa. After a term as Vice-President and General Manager of the Evans & Howard Fire Brick Co., St. Louis, Mo., he founded his own company, The A. P. Green Fire Brick Co., Mexico, Mo. He has developed this Company into one of the largest and most up-to-date ceramic organizations in the world, at the same time being directly or indirectly responsible for many of the most important developments in ceramic refractories during the last thirty years. This Company has always been his chief interest and it constitutes the foundation or bulwark from which all his other numerous responsibilities have sprung. Some of the highly responsible positions for which he has been drafted are the following: President, Risher Fire Brick Co., Chicago, Ill., Metropolitan Fire Brick Co., Brooklyn, N. Y., and Bigelow-Liptak Corp., Detroit, Mich.; Partner, E. J. Bartells Co., Seattle, Wash., and Economy Arch Co., St. Louis, Mo.; Chairman, Liptak Furnace Arches, Ltd., London, England; President, S. A. Materiales Refractories, A. P. Green, Buenos Aires, Argentina, A. P. Green Chilena Lt. da Santiago, Chile, and A. P. Green Fire Brick Co., Toronto, Ontario, Canada; Director and member of Executive Committee, Wabash, Ann Arbor, and New Jersey, Illinois & Indiana Railroads; Director and member of Committee of Railroad Directors Agreement for Commissioner Plan for Railroads West of the Mississippi River; and Director, Mercantile Bank & Trust Co., St. Louis, Mo., Region 8, Boy Scouts of America, and Missouri Y.M.C.A.

Allen Percival Green

He is an Elder of the First Presbyterian Church, Mexico, Mo., a Thirty-Second Degree Mason, and a Trustee of the Masonic Association of Missouri. He is a member of the City Club of St. Louis; Noonday Club of St. Louis; Missouri Athletic Association; Racquet Club of St. Louis; Country Club of Mexico, Mo.; Bath Club, Surf Club, Indian Creek Golf Club, and Biscayne Bay Yacht Club, Miami Beach, Fla.; Caribbean Club, Miami, Fla.; and Bankers Club of America, New York, N. Y.

He is a Trustee and Chairman of the Executive Committee of Westminster College, Fulton, Mo., and is now Chairman of the Board of Visitors of the University of Missouri.

His life is a demonstration of American democracy at work with all of its opportunities and accompanying responsibilities, a democracy that is worth fighting for. His career shows that it is still possible in this democracy of ours for one to start at the bottom and rise to the highest positions in technology and engineering, manufacturing, finance, banking, railroading, education, and that kind of good citizenship that is evidenced by his interest in religious, social, fraternal, and philanthropic organizations. Sheer ability alone would not suffice for achievements of such magnitude. Character of the highest type is implied.

In 1935, his home-town folks of Mexico, Mo., devoted a day to celebrating the twenty-fifth anniversary of his coming to Mexico and starting his Company. That shows what the people who know him best think of him as a man and a citizen. Recently his Company was awarded the coveted Maritime "M" for distinguished service to the nation in its war effort. His is the first and only Company of its kind to win this honor. That shows what the United States government thinks of his patriotic services. Westminster College of Fulton, Mo., has conferred upon him the degree of Doctor of Laws, and the University of Missouri School of Mines and Metallurgy has conferred upon him the degree of Doctor of Engineering. That shows what higher education in the State of Missouri thinks of him. It remains for him to be honored in ceramic circles. The entire superstructure of his achievements and services is built upon the solid rock of ceramics. Success in the ceramic profession made all the other successes possible. As such, he and his career will stand as an everlasting inspiration to young ceramic graduates starting their life's work in the ceramic profession. It is fitting, therefore, that there should be added to his other honors one that comes to him through the medium of a ceramic institution.

Mr. President, on behalf of the New York State College of Ceramics, I have the high honor and very special personal pleasure of presenting for the honorary degree of Doctor of Science, our distinguished guest and my esteemed friend, Allen Percival Green.

EVERETT G. COUCH, JR.

Everett G. Couch, Jr., formerly associated with the Anchor Hocking Glass Corp., Lancaster, Ohio, as ceramic engineer, has been appointed executive in sales and development engineering for the Charles Taylor Sons Co., Cincinnati, Ohio.

Everett G. Couch, Jr.

A graduate of North Carolina State College and the University of Toronto, Mr. Couch holds Bachelor's and Master's degrees in applied science. He will work from the general office of the Charles Taylor Sons Company.

Mr. Couch has been a member of The American Ceramic Society since 1934.

J. D. CLARK WITH FOOTE MINERAL COMPANY

John Douglas Clark, until recently associated with the Edgar Brothers and Edgar Plastic Kaolin companies, Metuchen, N. J., has joined the staff of the Foote Mineral Co., 1609 Summer St., Philadelphia, Pa., where he will be engaged as service engineer in the ceramic and allied industries.

Mr. Clark received his B.S. degree in ceramic engineering in 1939 from Ohio State University, Columbus, Ohio. During the following year, he was engaged in the study of ceramic materials and processes in the Ohio State University Graduate School.

While associated with the Edgar organization as ceramic service engineer, Mr. Clark traveled extensively in the eastern and middle western states.

He has been a member of The American Ceramic Society since 1941.

ADOLPH VALLEY

Adolph Valley, manager of the Cleveland Branch of Innis, Speiden & Co., New York, N. Y., died April 10, 1943, following a short illness.

Mr. Valley was born in Estonia, October 2, 1903. He later moved with his family to Cleveland, Ohio, where he attended high school.

Following his graduation from Ohio State University as a chemical engineer in 1925, he became associated with the Pfaudler Co., Elyria, Ohio, where he was engaged in development and metallurgical work. He later entered their Sales Division and worked in the New York and Chicago offices. He joined the sales force of the Cleveland Branch of Innis, Speiden & Co., November 20, 1933, and became manager of the Branch in January, 1942.

Mr. Valley keenly enjoyed meeting people and helping them work out specific problems. He had many friends in the Ohio area in the various manufacturing industries, many of whom called upon him frequently to assist them with his chemical engineering and technical knowledge.

He is survived by his widow, Ruth Richter Valley.

Mr. Valley had been a member of The American Ceramic Society since January, 1943.

VICTOR J. ROEHM

Victor J. Roehm, ceramic engineer and Fellow of The American Ceramic Society, has joined the staff of the Central Silica Co., Zanesville, Ohio, as consultant and sales engineer. This association does not terminate or change Mr. Roehm's affiliation as ceramic engineer for the Kentucky Clay Mining Co., Mayfield, Ky., and the Feldspar Milling Co., Burnsville, N. C.

ERNEST B. MERRY AND THE MERRY BROTHERS BRICK & TILE COMPANY

History of Company

In 1870, Henry A. Merry liquidated his mercantile business located at Augusta, Ga., and with his wife, Arabella Holmes Merry, moved to the country because of his conviction that a farm was a better place to raise their children than the city.

Nine children were born to Henry and Arabella Merry and were raised on the farm at Berzelia, Columbia County, Georgia. By hard work and thriftiness during the trying days of reconstruction, the children were all educated and given a start in life.

In the spring of 1888, Arthur H. Merry was graduated from Emory College, then located at Oxford, Ga., with an A.B. degree.

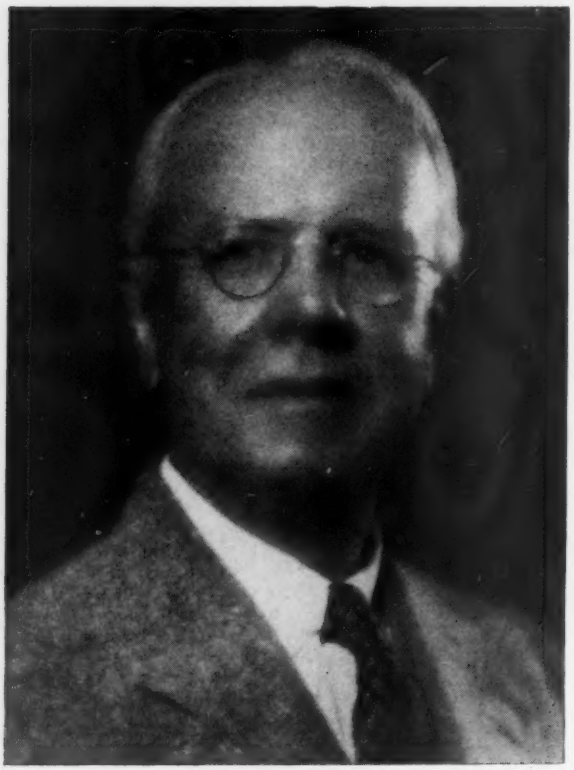
In 1894, Ernest B. Merry was graduated with high honors from the Georgia School of Technology, Atlanta, Ga., where he received the degree of Bachelor of Science in Mechanical Engineering.

Owing to the depressed condition of the country at that time, Ernest B. Merry could not immediately follow his engineering training but was forced to return to the family farm, which he operated in connection with a saw mill. Arthur H. Merry found employment as a shipping clerk at the Augusta Brick Company and at that time became interested in the possibility of owning and operating a brick business.

In 1899, with a meager capital of $3000, and some mules, wagons, and cord wood, Arthur H. Merry and Ernest B. Merry leased a brickyard located in North Augusta, S. C. Their early efforts almost came to naught, owing to their limited capital, but by hard work and some good fortune, they survived the first year and were able to sell their production output. After three years' operation of this leased plant, the brothers had accumulated sufficient capital to buy clay lands and build a small brick plant at Augusta, Ga. This plant was first put into operation in 1902 and has been continuously operated on this site to

the present day. From this small beginning, Merry Brothers Brick & Tile Company has grown and expanded until at the present time it is one of the largest clay products manufacturing plants in the Southeast.

Ernest B. Merry was the guiding hand in the mechanical and operational development of the plant and he, with his brother, Arthur, had developed the business into a well-established company by the time their sons became affiliated with the operation and management of the Company in the twenties.



Ernest B. Merry, Sr.

In 1918, Kenneth H. Merry, the son of Arthur H. Merry, was graduated from the Georgia School of Technology and joined the U. S. Army with the rank of Second Lieutenant (Engineers). At the end of the First World War and upon his release from the Army in 1919, he became associated with the Company.

In 1928, Guy H. Merry, another son of Arthur H. Merry, also became associated with the Company after his graduation from Ohio State University with the degree of Bachelor of Science in Ceramic Engineering.

In 1929, Ernest B. Merry, Jr., the son of Ernest B. Merry, was graduated from the Georgia School of Technology with the degree of Bachelor of Science in Ceramic Engineering and became associated with the Company.

During the depression of the early thirties, Ernest B. Merry, Jr., and Guy H. Merry were given the task of increasing the efficiency of the operations through a program of experimental and engineering analysis. The Company successfully weathered the depression and by 1933 the plant and equipment was operating at a high state of efficiency.

The Company had added hollow tile to its manufacturing line in the early twenties, but up until 1933 the sales of this line had not been extensively developed.

Shortly after this time, Arthur H. Merry and Ernest B. Merry turned over the active management of the Company's operations to the younger generation, with Arthur H. Merry devoting his attention entirely to the administration of the business and Ernest B. Merry, Sr., acting largely in an advisory capacity because of the condition of his health. At this time, Guy H. Merry was made Sales Manager and Kenneth and Ernest B. Merry, Jr., were made General Manager and Production Manager, respectively. By close cooperation between these three men, the manufacture and sale of tile were greatly expanded until at the present time the tile production of this Company is at least equal to the brick production.

On August 31, 1938, the Company was saddened by the death of its President, Arthur H. Merry. Ernest B. Merry became President and continued in that capacity until his death on March 21, 1943, which caused the Company again to mourn the loss of a respected and beloved leader.

At the present time the Company is being operated by the second generation, namely, Kenneth H. Merry, President and Treasurer; E. B. Merry, Jr., Vice-President and General Manager; and Guy H. Merry, Secretary and Sales Manager.

The Company is now actively engaged in manufacturing structural clay products and is operating with 100% of its production facilities devoted to the war effort. The Company has excellent prospects of continued success during the war and the peace that will follow.

Death of Ernest B. Merry, Sr., March 21, 1943*

Born February 21, 1869, Ernest B. Merry, Sr., received his secondary education at Harlem and Augusta, Ga. While a student at the Georgia School of Technology, he was a member of Phi Kappa Phi, national honorary scholastic fraternity, and Alpha Tau Omega.

In 1905, he married Eva Daniel of Columbus and Augusta, Ga. Three children were born to them.

Although of a retiring disposition, Mr. Merry took a wide interest in church and civic affairs. He was a member of St. John Methodist Church and had served for many years as chairman of the board of stewards. He attended services regularly until his health failed. His success in life enabled him, in his quiet way, to take a large financial interest in his church and charitable institutions.

His recreation consisted mainly in travel and golf. He was a member of the Augusta National but was compelled to discontinue active play in his late years.

* Excerpts from *Augusta Chronicle*, March 22, 1943.

HOMER J. TAYLOR

Homer J. Taylor, former president of Knowles, Taylor & Knowles Co., East Liverpool, Ohio, and grandson of Isaac Watts Knowles, died March 5, 1943, in Burbank, Calif.

Mr. Taylor became president of the Company following the death of his father, Colonel J. N. Taylor, in 1914, and continued in that capacity until the plants were closed following the failure of the American China Corporation.

RALPH W. HULL

Ralph W. Hull, Secretary of the Star Stoneware Co. Crooksville, Ohio, for seventeen years died May 20, 1943.

Mr. Hull was an amateur magician and former Bible lecturer over Columbus, Ohio, radio stations and had operated a stock farm near Crooksville for many years.

FRANK B. DUNN

Frank B. Dunn, 68, inventor of the Dunn wire-cut lug for paving brick and former assistant to the president of the National Paving Brick Association, died April 6, 1943, in Conneaut, Ohio

Mr. Dunn held numerous patents on paving brick designs, the latest of which was a new type of end lug invented in 1936.

He had been a member of The American Ceramic Society since 1916.

Prosperity Is Earned
It Cannot Be Purchased

Billions Expended on War Cannot Be Retrieved.

They Create No Usable Resource: They Impoverish.

Postwar-Expended Billions Will Be Retrievable
Only from Resources Created by Labor.

Billions Given Away Without the Creation of Resources
Are More Impoverishing
Than Billions Spent on War Materials and Services.

Men Prosper only by Creating and Saving.
Postwar Prosperity for Ceramists Will Be Obtained
By Cooperatively Creating and Saving.

For this Purpose, Ceramists Have
THE AMERICAN CERAMIC SOCIETY, INC.

PAID MEMBERSHIP AND SUBSCRIPTION RECORD

Date of Record	Members Paid		Deferred	Subscriptions	Monthly Sales	Total Circulation
	Personal	Corporation				
December 19, 1939	1876	237	27	642	220	3002
December 20, 1940	1995	260	25	574	220	3074
December 21, 1941	2029	257	37	609	220	3152
December 21, 1942	2088	270	15	446	220	3039
January 21, 1943	2079	267	11	444	220	3021
February 21, 1943	2095	267	10	451	220	3043
March 21, 1943	1765	262	8	416	220	2671
April 21, 1943	1909	266	18	442	220	2855
May 21, 1943	1931	280	15	438	220	2884

ROSTER OF PAID CORPORATION MEMBERS

Abbé Engineering Co., New York, N. Y.
Abingdon Sanitary Mfg. Co., Abingdon, Ill.
A C Spark Plug Co., Flint, Mich.
Adamston Flat Glass Co., Clarksburg, W. Va.
Akron Porcelain Co., Akron, Ohio
Alabama Clay Products Co., Birmingham, Ala.
Alton Brick Co., Alton, Ill.
American Clay Forming Co., Tiffin, Ohio
American Crucible Co., Shelton, Conn.
American Emery Wheel Works, Providence, R. I.
American Gas Assn., New York, N. Y.
American Lava Corp., Chattanooga, Tenn.
American Nepheline Corp., Rochester, N. Y.
American Porcelain Enamel Co., Muskegon, Mich.
American Potash & Chemical Corp., New York, N. Y.
American Radiator & Standard Sanitary Corp., Louisville, Ky.
American Refractories Institute, St. Louis, Mo.
American Rolling Mill Co., Middletown, Ohio
American Stove Company, St. Louis, Mo.
American Window Glass Co., Pittsburgh, Pa.
Amsler-Morton Co., Inc., Pittsburgh, Pa.
Anchor Hocking Glass Corp., Lancaster, Ohio
Arketex Ceramic Corp., Brazil, Ind.
Armstrong Cork Co., Lancaster, Pa.

Babcock & Wilcox Co., New York, N. Y.
Ball Brothers Co., Muncie, Ind.
Baltimore Enamel & Novelty Co., Baltimore, Md.
Bardin, Paul, e Hijos, Soc. Anon. Com., Buenos Aires, Argentina, South America
Bausch & Lomb Optical Co., Rochester, N. Y.
Bay State Abrasive Products Co., Westboro, Mass.
Binghamton Brick Co., Binghamton, N. Y.
Blue Ridge Glass Corp., Kingsport, Tenn.
Blythe Color Works, Ltd., Stoke-on-Trent, England
Bonnot Company, Canton, Ohio
Braun Corp., Los Angeles, Calif.
Brockway Glass Company, Inc., Brockway, Pa.
Buck Glass Company, Baltimore, Md.
Buffalo Pottery Co., Buffalo, N. Y.
Butcher, L. H., Co., Los Angeles, Calif.

Canton Stamping & Enameling Co., Canton, Ohio
Carborundum Company, Niagara Falls, N. Y.
Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Carr-Lowrey Glass Co., Baltimore, Md.
Central Silica Company, Zanesville, Ohio
Ceramic Color & Chemical Mfg. Co., New Brighton, Pa.
Ceramics Publishing Co., Inc., Newark, N. J.
Certain-teed Products Corp., Chicago, Ill.
Champion Spark Plug Co., Detroit, Mich.
Chattanooga Glass Co., Chattanooga, Tenn.
Chicago Hardware Foundry Co., North Chicago, Ill.
Chicago Pottery Co., Chicago, Ill.
Chicago Retort & Fire Brick Co., Chicago, Ill.
Chicago Vitreous Enamel Product Co., Cicero, Ill.
Clark, N., & Sons, Alameda, Calif.
Colonial Insulator Co., Akron, Ohio
Commercial Decal Products, Inc., East Liverpool, Ohio
Consolidated Feldspar Corp., Trenton, N. J.
Coors Porcelain Company, Golden, Colo.
Corhart Refractories Co., Inc., Louisville, Ky.
Corning Glass Works, Corning, N. Y.
Corning Glass Works, Macbeth-Evans Div., Charleroi, Pa.
Crane Enamelware Company, Chattanooga, Tenn.
Cronin China Co., Minerva, Ohio
Crooksville China Co., Crooksville, Ohio
Crossley Machine Co., Trenton, N. J.
Crossman Company, South Amboy, N. J.
Crown Potteries Co., Evansville, Ind.

Demuth Glass Works, Inc., Brooklyn, N. Y.
Denver Sewer Pipe & Clay Co., Denver, Colo.
DeVilbiss Co., Toledo, Ohio
Diamond Alkali Co., Pittsburgh, Pa.
Dixon, Joseph, Crucible Co., Jersey City, N. J.
Douglas, John, Co., Cincinnati, Ohio
Drakenfeld, B. F., & Co., Inc., New York, N. Y.
Du Pont, E. I., de Nemours & Co., Inc., Wilmington, Del.

Eastern Clay Products, Inc., Eifort, Ohio.
Edgar Plastic Kaolin Co., Metuchen, N. J.
Electric Auto-Lite Co., Fostoria, Ohio
Electro Refractories & Alloys Corp., Buffalo, N. Y.
Engelhard, Charles, Inc., Newark, N. J.
English China Clays Sales Corp., New York, N. Y.
Eureka Flint & Spar Co., Trenton, N. J.
Exolon Company, Blasdell, N. Y.

Fabrica de Ladrillos Industriales y Refractarios, Monterrey, N. L., Mexico
Fairfacts Company, Inc., Trenton, N. J.
Federal Glass Co., Columbus, Ohio
Federal Seaboard Terra Cotta Corp., Perth Amboy, N J.
Ferro Enamel Corp., Cleveland, Ohio
Ferro Enamels (Australia) Pty., Ltd., Alexandria, Australia
Ferro Engineering Co., Cleveland, Ohio
Findlay Clay Products Co., Washington, Pa.
Foote Mineral Co., Philadelphia, Pa.
Fords Porcelain Works, Perth Amboy, N. J
Fostoria Glass Co., Moundsville, W. Va.
Frazier-Simplex, Inc., Washington, Pa.
French Saxon China Co., Sebring, Ohio

Garco Products, Inc., Butler, Pa.
Garfield Refractories Co., Bolivar, Pa.
Gayner Glass Works, Salem, N. J.
General Ceramics Co., New York, N. Y.
General Color & Chemical Co., Sebring, Ohio
General Electric Co., Lamp Dept., Pitney Glass Works, Nela Park, Cleveland, Ohio
George, W. S., Pottery Co., East Palestine, Ohio
Gillinder Brothers, Inc., Port Jervis, N. Y.
Gladding, McBean & Co., Lincoln, Placer County, Calif
Gleason-Tiebout Glass Co., Maspeth, N. Y.
Glenboig Union Fireclay Co., Ltd., Glenboig, Lanarkshire, Scotland
Globe Brick Co., East Liverpool, Ohio
Great Lakes Foundry Sand Co., Detroit, Mich.
Great Lakes Steel Corp., Detroit, Mich.
Green, A. P., Fire Brick Co., Mexico, Mo.

Haeger Potteries, Inc., Dundee, Ill.
Hall China Company, East Liverpool, Ohio
Hampton Grinding Wheel Co., Springfield, Mass.
Hancock Brick & Tile Co., Findlay, Ohio
Hanley Company, Summerville, Pa.
Hanovia Chemical & Mfg. Co., Newark, N. J.
Hardinge Company, Inc., York, Pa.
Harshaw Chemical Co., Cleveland, Ohio
Hartford-Empire Co., Hartford, Conn.
Haws Refractories Company, Johnstown, Pa.
Hazel-Atlas Glass Co., Washington, Pa.
Hommel, O., Co., Pittsburgh, Pa.
Houze, L. J., Convex Glass Co., Point Marion, Pa.

Illinois Clay Products Co., Joliet, Ill.
Illinois Water Treatment Co., Rockford, Ill.
Industrial Ceramic Products, Inc., Columbus, Ohio
Ingram-Richardson Mfg. Company of Indiana, Inc., Frankfort, Ind.
International Clay Machinery Co., Dayton, Ohio
International Smelting & Refining Co., Akron, Ohio
Ironton Fire Brick Co., Columbia, S. C.
Isolantite, Incorporated, Belleville, N. J.

John Walsh Walsh, Ltd., Birmingham, England
Johns-Manville Sales Corp., New York, N. Y.
Jova Brick Works, Roseton, N. Y.

Kentucky Clay Mining Co., Mayfield, Ky.
Kentucky-Tennessee Clay Co., Alliance, Ohio
Knowles, Edwin M., China Co., Newell, W. Va.
Kohler Company, Kohler, Wis.
Koppers Company, Pittsburgh, Pa.
Kraftile Company, Niles, Calif.

Laclede-Christy Clay Products Co., St. Louis, Mo.
Lancaster Iron Works, Lancaster, Pa.
Lapp Insulator Co., Inc., Le Roy, N. Y.
Laughlin, Homer, China Co., Newell, W. Va.
Lava Crucible Co. of Pittsburgh, Pittsburgh, Pa.
Lawrence Clay Co., Jackson, Ohio
Lee Clay Products Company, Clearfield, Ky.
Libbey Glass Company, Toledo, Ohio
Libbey-Owens-Ford Glass Co., Toledo, Ohio
Locke Insulator Corp., Baltimore, Md.
Louthan Manufacturing Co., East Liverpool, Ohio
Lynch, A. J., & Co., Los Angeles, Calif.

Mansfield Sanitary Pottery, Inc., Perrysville, Ohio
Marshall-Eclipse Div., Bendix Aviation Corp., Troy, N.Y.
Maryland Glass Corp., Baltimore, Md.
Mathieson Alkali Works, Inc., New York, N. Y.
Maxson, Elwyn L., Glendale, Calif.
McHose, L. H., Inc., Perth Amboy, N. J.
McKee, Arthur G., & Co., Cleveland, Ohio
McLain Fire Brick Co., Pittsburgh, Pa.
Metal & Thermit Corp., Rahway, N. J.
Mexico Refractories Co., Mexico, Mo.
Mississippi Glass Co., New York, N. Y.
Mitchell Clay Mfg. Co., St. Louis, Mo.
Moore Enameling & Mfg. Co., West Lafayette, Ohio
Moore & Munger, New York, N. Y.
Morton Pottery Co., Morton, Ill.
Mosaic Tile Company, Zanesville, Ohio
Mount Clemens Pottery Co., Mount Clemens, Mich.
Mullite Refractories Co., Seymour, Conn.

National Engineering Co., Chicago, Ill.
National Fireproofing Corp., Pittsburgh, Pa.
National Gypsum Co., Luckey, Ohio
National Industrial Sand Assn., Washington, D. C.
National Lead Co., Brooklyn, N. Y.
National Lime and Stone Co., Findlay, Ohio
National Refractories Co., Inc., Philadelphia, Pa.
National Sales Corp., Cincinnati, Ohio
New Castle Refractories Co., New Castle, Pa.
New Jersey Porcelain Co., Trenton, N. J.
North American Refractories Co., Cleveland, Ohio
North Carolina Feldspar Corp., Erwin, Tenn.
Norton Company, Worcester, Mass.

Ohio Clay Co., Cleveland, Ohio
Ohio Hydrate & Supply Co., Woodville, Ohio
Ohio Insulator Company Div., Ohio Brass Co., Barberton, Ohio
Old Hickory Clay Co., Paducah, Ky.
Onondaga Pottery Co., Syracuse, N. Y.
Orefraction, Inc., Pittsburgh, Pa.
Orton, Edward, Jr., Ceramic Foundation, Columbus, Ohio
Owens-Corning Fiberglas Corp., Newark, Ohio
Owens-Illinois Glass Co., Alton, Ill.
Owens-Illinois Pacific Coast Co., Oakland, Calif.

Pacific Clay Products, Los Angeles, Calif.
Pacific Coast Borax Co., New York, N. Y.
Paper Makers Importing Co., Inc., Easton, Pa.
Pass & Seymour, Inc., Solvay, N. Y.
Pearson, E. J. & J., Ltd., Stourbridge, England
Pennsylvania Pulverizing Co., Lewistown, Pa.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Pettinos, George F., Inc., Philadelphia, Pa.
Pfaudler Company, Rochester, N. Y.
Pittsburgh Plate Glass Co., Creighton, Pa.
Polaroid Corp., Cambridge, Mass.
Porcelain Enamel & Mfg. Co., Baltimore, Md.
Porcelain Metals Corp. of Louisville, Louisville, Ky.
Porcelain Products, Inc., Findlay, Ohio
Portsmouth Clay Products Co., Portsmouth, Ohio
Potters Supply Co., East Liverpool, Ohio
Precision Grinding Wheel Co., Philadelphia, Pa.
Pyro Clay Products Co., Oak Hill, Ohio

Quigley Company, Inc., New York, N. Y.

Ramtite Co., Chicago, Ill.
Ransome Concrete Machinery Co., Dunellen, N. J.
Refractory & Insulation Corp., New York, N. Y.
Remmey, Richard C., Son Co., Philadelphia, Pa.
Republic Steel Corp., Cleveland, Ohio
Riddell, W. A., Co., Bucyrus, Ohio
Robeson Process Co., New York, N. Y.
Roseville Pottery, Inc., Zanesville, Ohio
Ross-Tacony Crucible Co., Philadelphia, Pa.
Rustless Iron Co., Ltd., Keighley, England

Safety Grinding Wheel & Machine Co., Springfield, Ohio
Seagram, Joseph E., & Sons, Inc., Louisville, Ky.
Shenango Pottery Company, New Castle, Pa.
Simonds Worden White Co., Dayton, Ohio
Smith, A. O., Corp., Milwaukee, Wis.
Smith & Stone, Ltd., Georgetown, Ontario, Canada
Solvay Process Company, Syracuse, N. Y.
Sovereign Potters, Ltd., Hamilton, Ontario, Canada
Spinks, H. C., Clay Co., Newport, Ky.
Square D Company, Detroit, Mich.
Standard Brick and Tile Corp., Evansville, Ind.
Star Porcelain Co., Trenton, N. J.
Stark Brick Co., Canton, Ohio
Stauffer Chemical Co., New York, N. Y.
Steele, J. C., & Sons, Statesville, N. C.
Sterling Grinding Wheel Co., Tiffin, Ohio
Stockton Fire Brick Co., San Francisco, Calif.
Structural Clay Products Institute, Washington, D. C.
Stupakoff Laboratories, Inc., Latrobe, Pa.
Summitville Face Brick Co., Summitville, Ohio
Sur Enamel & Stamping Works, Ltd., Calcutta, India
Surface Combustion Corp., Toledo, Ohio
Swindell Brothers, Baltimore, Md.
Swindell-Dressler Corp., Pittsburgh, Pa.
Sylvania Electric Products, Inc., Emporium, Pa.

Taylor, Smith & Taylor Co., Chester, W. Va.
Texas Mining & Smelting Co., Laredo, Texas
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
Trenton Potteries Co., Trenton, N. J.
Twyfords, Ltd., Cliffe Vale Potteries, Stoke-on-Trent, England
Tyler, W. S., Company, Cleveland, Ohio

Union Electrical Porcelain Works, Inc., Trenton, N. J.
United Clay Mines Corp., Trenton, N. J.
United Glass Bottle Mfrs., Ltd., London, England
United States Gypsum Co., Chicago, Ill.
Universal Clay Products Co., Sandusky, Ohio
Universal Dental Co., Philadelphia, Pa.
Universal Sanitary Mfg. Co., New Castle, Pa.

Vanderbilt, R. T., Company, New York, N. Y.
Vereeniging Brick & Tile Co., Ltd., Vereeniging, Transvaal South Africa
Vesuvius Crucible Co., Swissvale, Pa.
Victor Insulators, Inc., Victor, N. Y.
Vitrefrax Corporation, Los Angeles, Calif.
Vitreous Steel Products Co., Cleveland, Ohio
Vitro Manufacturing Co., Pittsburgh, Pa.

Wallace China Co., Ltd., Huntington Park, Calif
Waltham Grinding Wheel Co., Waltham, Mass.
Washington Porcelain Co., Washington, N. J.
Wayne Laboratories, Waynesboro, Pa.
Western Brick Co., Danville, Ill.
Western Electric Co., Chicago, Ill.
Westinghouse Electric & Mfg. Co., Derry, Pa.
West Virginia Brick Co., Charleston, W. Va.
Wheeling Steel Corp., Yorkville, Ohio
Willson Products, Inc., Reading, Pa.
Wisconsin Porcelain Co., Sun Prairie, Wis.

JOSEPH H. KRUSON

The professional degree of ceramic engineer was conferred upon Joseph H. Kruson, vice-president of the Mexico Refractories Co., Mexico, Mo., at the commencement exercises held at the New York State College of Ceramics, Alfred, N. Y., May 10, 1943.

Biography

Mr. Kruson was born at Wellsville, N. Y., April 15, 1894, and attended the Wellsville High School. He later studied ceramics at Alfred University and at Ohio State University, Columbus, Ohio.

From 1919–1920, he was employed by the Laclede-Christy Clay Products Co., St. Louis, Mo., and from 1920–1921 by the Acme Brick Co., Fort Worth, Texas. For the following nine years, he was associated with the A. P. Green Fire Brick Co., Mexico, Mo., as ceramic engineer and director of research.

In 1930, Mr. Kruson was co-founder of the Mexico Refractories Co., Mexico, Mo., the Company of which he is now vice-president. He is also vice-president of the National Refractories Co., Philadelphia, Pa., and of the Big Savage Refractories Co., Frostburg, Md.

He has been a member of The American Ceramic Society since 1922 and is an honorary member of the chapter of Keramos at the New York State College of Ceramics.

Publications

(1) "Standardization of Burning," *Brick & Clay Record*, **59**, 106–10 (1921).

(2) "Successful Operation of a Waste-Heat Drier," *ibid.*, pp. 266–68.

(3) "Refractory Clays of Texas," *Jour. Amer. Ceram. Soc.*, **5** [9] 643–45 (1922).

(4) "Insulation of Periodic Kilns," *ibid.*, **6** [10] 1069–74 (1923).

(5) "Insulation of Kilns," *Brick & Clay Record*, **63**, 22–26 (1923).

(6) "Grinding and Screening Clays," *ibid.*, pp. 691–94.

(7) (With C. A. Smith), "Manufacture and Physical Properties of Dry-Press Brick," *Jour. Amer. Ceram. Soc.*, **8** [12] 829–32 (1925).

(8) "Preparing Refractories for Rotary Kilns," *Rock Products*, **30** [19] 73–77 (1927).

(9) "General Chemical and Physical Properties of Refractories," *Power*, **74** [17] 614–15 (1931).

NEW MEMBERS IN MAY

Corporation

*Alabama Clay Products Co., A. S. Holberg (voter), 830–35 Martin Bldg., Birmingham, Ala.

*Chicago Retort & Fire Brick Co., A. H. Taylor (voter), 208 S. LaSalle St., Chicago, Ill.

*Denver Sewer Pipe & Clay Co., William J. Geddes (voter), Box 2329, Denver, Colo.

Eastern Clay Products, Inc., N. J. Dunbeck (voter), Eifort, Ohio.

Garfield Refractories Co., Kenneth A. Rugh (voter), Bolivar, Pa.

General Color & Chemical Co., Harry J. Keener (voter), Sebring, Ohio.

General Refractories Co., Russell P. Heuer (voter), 1600 Real Estate Trust Bldg., Philadelphia, Pa.

Lawrence Clay Co., H. H. Stephenson (voter), Jackson, Ohio.

*McLain Fire Brick Co., W. A. Turner (voter), 1239 Gulf Bldg., Pittsburgh, Pa.

Mullite Refractories Co., Charles W. Fyfe (voter), Shelton, Conn.

Pettinos, George F., Inc., George F. Pettinos, Sr. (voter), 1206 Locust St., Philadelphia, Pa.

Purinton Pottery Co., B. S. Purinton (voter), Shippenville, Pa.

Pyro Clay Products Co., W. G. Griffiths (voter), Oak Hill, Ohio.

Refractory & Insulation Corp., H. N. Clark (voter), 120 Wall St., New York, N. Y.

*Stockton Fire Brick Co., J. T. Roberts (voter), 1267 Russ Bldg., San Francisco, Calif.

Personal

*Akam, J. W., Aldershot, Ontario, Canada; National Fireproofing Co.

Arnold, A. Russell, Henry Ave., East Liverpool, Ohio; sales representative, E. I. du Pont de Nemours & Co., Inc.

Beck, J. Howard, 21 Supple Rd., Dorchester, Mass.; development engineer, Ideal Tooth, Inc.

*Beeton, Earl E., 342 Murray St., Elizabeth, N. J.; engineer, Western Electric Co.

*Black, Lloyd V., 1006 Oregon Ave., Tarentum, Pa.; Research Dept., Pittsburgh Plate Glass Co.

*Blair, Marion W., 2131 S. Center St., Terre Haute, Ind.; associate sales engineer, Manufacturers Equipment Co.

*Campbell, Van E., 363 Highland Ave., Wadsworth, Ohio; ceramic engineer, Ohio Brass Co.

*Carlyle, Edward C., Box 128, Ironton, Ohio; secretary, Carlyle Tile Co.

Charbonnier, William P., 9968 Valley Dr., Baden Sta., St. Louis, Mo.; superintendent, Walsh Refractories Corp.

Coffin, Leon B., West School Lane, Yardley, Pa.; ceramic engineer, Lenox, Inc.

Crandall, William B., New York State College of Ceramics, Alfred, N. Y.; graduate instructor.

Davison, Albert W., 1119 Moundview Ave., Newark, Ohio; scientific director, Owens-Corning Fiberglas Corp.

*Donnenwirth, A. L., Carborundum Co., Niagara Falls, N. Y.

Duncan, J. Earle, 1014 Linden Ave., Tarentum, Pa.; research chemist, Pittsburgh Plate Glass Co.

*Earl, J. Alfred, Vitro Mfg. Co., Corliss Sta., Pittsburgh, Pa.

*Fairchild, Theodore M., 339 Yale Ave., Johnstown, Pa.; general foreman, brick masons, Bethlehem Steel Co.

Falconer, Donald P., 45–15 Vernon Blvd., Long Island City, N. Y.; technician and engineer, F. E. Schundler & Co., Inc.

*Falknor, Tom, Edgar Bros. Co., Metuchen, N. J.

Foley, Percy T., Sub. P.O. 4, Saint John, New Brunswick, Canada; partner, Canuck Pottery.

Foster, Wilfrid R., Room 301, Hotel Webster Hall, Detroit, Mich.; petrographer, Champion Spark Plug Co.

Gagnon, R. A., E. I. du Pont de Nemours & Co., Inc., Newport, Del.; research chemist.

Giehler, F. J., 737 Pearl St., Ottawa, Ill.; superintendent, Chicago Retort & Fire Brick Co.

Gornall, Henry A., 4150 East 56th St., Cleveland, Ohio; Allied Engineering Co.

*Halloin, William G., 1218 Broadview Blvd., Brackenridge, Pa.; research engineer, Pittsburgh Plate Glass Co.

Johnson, Ernest W., 971 Mountain Ave., Westfield, N. J.; research chemist, Metal & Thermit Corp.

*Kidner, Vernon H., 473 Marlin Dr., Pittsburgh, Pa.

* Indicates former member of The Society rejoining.

KIRK, CHARLES L., 311 Ross St., Pittsburgh, Pa.; vice-president, Eddystone Portland-Puzzolan Cement Co.
NASH, SIMEON, JR., 156 South 17th St., Columbus, Ohio.
NELLEY, JOHN W., Edgar Thomson Works, Carnegie-Illinois Steel Corp., Braddock, Pa.; ceramic engineer.
NOVY, ANTON R., 2313 S. Ridgeland Ave., Berwyn, Ill.; associate ceramist, Armour Research Foundation.
PRICE, JAMES E., 5339 Greene St., Philadelphia, Pa.; petrographer, Abrasive Co.
*REIMER, JOHN J., Box 226, Alfred, N. Y.; research fellowship, New York State College of Ceramics.
RICE, MURRAY J., 133 N. Main St., Alfred, N. Y.; professor of chemistry, New York State College of Ceramics.
ROWLAND, LT. R. A., Proving Center, Aberdeen Proving Ground, Md. (formerly assistant petrographer, Illinois Geological Survey).
SANDERS, HARRY, Continental Ceramics, South Milwaukee, Wis.
*SHEPHERD, JOHN F., Shepherd Chemical Co., Norwood, Cincinnati, Ohio; treasurer.
SHUTE, ROBERT L., 125 N. Twenty-first St., Newark, Ohio; research engineer, Owens-Corning Fiberglas Corp.
SMITH, MAURICE A., II, Jeannette, Pa.; McKee Glass Co.
*SMITH, R. K., Corning Glass Works, Corning, N. Y.
*STEVENS, ROBERT P., Chicago Retort & Fire Brick Co., 208 S. LaSalle St., Chicago, Ill.; refractories engineer.
TEFFT, PHILIP W., Morrison Rd., Blacklick, Ohio; superintendent, Plant 4, Claycraft Co.
THORN, WILLIAM J., Innis, Speiden & Co., 401 N. Broad St., Philadelphia, Pa.; manager.
VONTURY, FRANCIS J., Lehigh Ave., Perth Amboy, N. J.; owner, Vontury Porcelain.
*WAGNER, BRUCE F., 421 Repton Rd., Riverside, Ill.; sales engineer, Titanium Alloy Mfg. Co.
WANNER, EDWIN F., 8611 Lynnbrook Dr., Bethesda, Md.; research engineer, Structural Clay Products Institute.
WEINHEIMER, PETER F., Perry Furnace Co., Erie, Pa.; refractories engineer, Interlake Iron Corp.
WILLIAMS, CHARLES K., 351 Ogden St., East Liverpool, Ohio; designer.
WINTER, ANIUTA, Research Enterprises, Ltd., Leaside, Ontario, Canada; director of research.
WISHART, ARTHUR W., 2108 36th St., Parkersburg, W. Va.; general manager, Parkersburg Div., Corning Glass Works.

Student

New York State College of Ceramics: THOMAS KNAPP, HARRY PARKER, AND LEO POZEFSKY.
North Carolina State College: CHARLES V. RUE.
Rutgers University: IRVING I. COHEN AND EDWARD D. PSEMENEKI.
Virginia Polytechnic Institute: BENSON ZWEIG.

MEMBERSHIP WORKERS' RECORD

Corporation

C. E. Bales	13	N. E. Cronin	1	Office	1

Personal

C. E. Bales	2	J. A. Jeffery	1
Leslie Brown	1	Heinrich Ries	1
J. L. Carruthers	1	W. C. Rueckel	1
S. F. Cox	3	H. G. Schurecht	1
J. L. Crawford	1	R. A. Shipley	1
W. H. East	1	C. F. Tefft	1
H. G. Fisk	1	A. A. Wells	2
J. C. Hostetter	1	Office	30

Student

W. H. East	3	R. L. Stone	1
E. P. McNamara	2	J. W. Whittemore	1

Grand Total **71**

* Indicates former member of The Society rejoining.

(1943)

ROSTER CHANGES FOR MAY †

Personal

ALLEN, ALFRED W., c/o S. J. Martenet, 3855 N. New Jersey St., Indianapolis, Ind. (Pittsburgh, Pa.)
ANDERSON, LT. WILLIAM D., Btry. D, 10th C.A., Fort Adams, R. I. (Fort Church, R. I.)
CAREY, J. SHELDON, R. D. 3, Bath, N. Y. (Saylesville, R. I.)
CORBMAN, MORRISS, University Club, Bethlehem, Pa. (Thomasville, N. C.)
CRUCIANA, F. L., Box 115, R. D. 1, Monaca, Pa. (New Brighton, Pa.)
DEWOLF, DANIEL W., 32 E. First St., Corning, N. Y. (Charleroi, Pa.)
EAGLE, J. EUGENE, 6306 20th Ave., Green Meadows, Hyattsville, Md. (Washington, D. C.)
EMISON, M. HERSHEL, Macbeth-Evans Div., Corning Glass Works, Charleroi, Pa. (Corning, N. Y.)
GEZELIUS, CARL V., 1643 S. Humboldt St., Denver, Colo. (Friant, Calif.)
LENNON, JOHN W., 21 Mertz Ave., Belleville, N. J. (Columbus, Ohio)
MELOY, CHARLES L., 941 Meigs St., Augusta, Ga. (Bayonne, N. J.)
NOYES, BRADFORD, Faichney Instrument Corp., Watertown, N. Y. (Rochester, N. Y.)
PARK, FRANK A., JR., 414 N. Jefferson St., New Castle, Pa. (Midland, Pa.)
PATTON, WILLIAM R., 1324 N. Walnut St., Dover, Ohio (Columbus, Ohio)
RHODES, GROVER C., Box 222, Peapack, N. J. (Somerville, N. J.)
ROLLFS, EDWARD H., 17838 Commercial Ave., Lansing, Ill. (Wyandotte, Mich.)
SEIL, GILBERT E., E. J. Lavino & Co., 1528 Walnut St., Philadelphia, Pa. (Plymouth Meeting, Pa.)
SOMMERVILLE, J. L., Winburne, Pa. (Camp Pickett, Va.)
STEELE, RICHARD E., 2980 Neil Ave., Columbus, Ohio (Lowville, N. Y.)
TEPPING, HERBERT, 1236 W. Hillcrest Ave., Dayton, Ohio (Cambridge, Mass.)
TORGESON, DALE R., 3202 W. Second St., Apt. G–5, Wilmington, Del. (Cape May Point, N. J.)
WILLIS, CAPT. JAMES B., Company F, 543d E.A.R., Fort Ord, Calif. (Fort Belvoir, Va.)

† Address in parentheses is former address.

FILM RECORD

The Film Library Committee of The Society is compiling a new list of current movie films related to the manufacture and use of ceramic products. If you have any such films or know of any available, will you kindly mail the information requested below to the Committee?

Previous lists have proved to be helpful in selecting interesting ceramic films for educational and advertising purposes. Please help us make this list as complete and instructive as possible by sending the information to the Committee at once. We desire to publish this list in *The Bulletin* in the near future.

Previous lists issued can be found in the following issues of *The Bulletin:* **16** [5] 211–13, [9] 378, [11] 456 (1937); **17** [7] 316, [12] 487 (1938); and **18** [7] 250–52 (1939).

Your help and immediate response will be appreciated.

Film Information Wanted: (1) Title or name of film, (2) Size (16 or 35 mm.), (3) Type (sound or silent; black and white or color), (4) Number of reels or approximate running time, (5) Brief description or story of film, and (6) Firm name and address.

—*Film Library Committee:*
ROSS C. PURDY, C. R. AUSTIN, and
H. E. SIMPSON, *Chairman,*
Mellon Institute, Pittsburgh, Pa.

CERAMIC NOTES AND NEWS

THE NAVY NEEDS RADAR OFFICERS

In view of the increasing needs of the Navy for Radar officers, a new program of training in Radar has been established which extends the field to additional types of engineers.

QUALIFICATIONS: Candidates should possess a degree from an accredited college or university in one of the following: Agricultural engineering, *ceramic engineering*, chemical engineering, chemistry, general engineering, industrial engineering, metallurgical engineering, metallurgy, and mining engineering or petroleum engineering. Candidates' training must have included college courses in calculus and at least one year of physics. Scholastic records must have been above average.

AGE BRACKET: Up to 35 years.

All candidates must meet naval physical requirements and possess officer like qualities.

Application should be made to the nearest Office of Naval Officer Procurement. These offices are located in principal cities throughout the United States.

PITTSBURGH SECTION

The last meeting of the year of the Pittsburgh Section was held May 10, 1943. It was Ladies' Night and took the form of a dinner meeting, held at the College Club of Pittsburgh. Arrangements for this meeting were made by Vice-President W. C. Rueckel. Approximately ninety members and guests enjoyed a fine dinner and the comfortable environment of the College Club.

After dinner, J. Earl Frazier, Vice-President of Frazier-Simplex, Inc., Washington, Pa., gave an illustrated talk on "Travels in the Caribbean." Mr. Frazier, who has traveled extensively, spoke principally of Puerto Rico and Cuba and illustrated the chief industries of these islands. He also pointed out some of the more favorable mineral deposits existing there.

The meeting was closed by a sincere expression of thanks by Chairman E. E. Marbaker to various local members for their help and cooperation in making the Annual Meeting of The American Ceramic Society a success.

Meetings will be discontinued during the summer months, and the program for the new year will be resumed in the fall.

—H. E. SIMPSON, *Secretary*

GEORGIA HARD CLAYS FOR PAPER

Practical methods for treating hard clays of Georgia to obtain satisfactory substitutes for high-grade soft clays used in the paper, rubber, and ceramic industries are described in a new Bureau of Mines publication entitled "The Hard and Soft Kaolins of Georgia" by T. A. Klinefelter, R. G. O'Meara, G. C. Truesdell, and Sidney Gottlieb.

Laboratory tests in the Bureau's experiment station at Tuscaloosa, Ala., have revealed that ball-milling or micronizing will convert the average hard Georgia kaolin, or clay, to the same grade as soft clays from the same state. The tests were made in cooperation with the University of Alabama as part of the Bureau's wartime program for greater utilization of the Nation's mineral deposits.

Copies of this Report of Investigation No. 3682 may be obtained from the Bureau of Mines, Department of the Interior, Washington, D. C.

CHEMICAL EXPOSITION DATES

The Nineteenth Exposition of Chemical Industries will be held the week of December 6 to 11, 1943, in Madison Square Garden, New York, N. Y.

Original plans for holding the Exposition in Grand Central Palace, New York, N. Y., have had to be changed inasmuch as the U. S. Army has commandeered the Exposition floors of the Palace for an induction center.

BATTELLE PUBLICATION LIST ISSUED

One-hundred and forty Battelle-originated books, patents, and journal contributions are listed in a new catalogue published by Battelle Memorial Institute, Columbus, Ohio, one of the country's largest organizations for industrial research. The catalogue, in booklet form, covers Battelle publications and patents for 1941–1942 and supplements a previous listing of over 500 publications and patents of prior date, which listing was published in 1941.

NEW YORK SOCIETY OF CERAMIC ARTS

The annual meeting of the New York Society of Ceramic Arts was held at the National Arts Club in New York, N. Y., May 6, 1943.

The following officers were elected for 1943–1944: *President*, MRS. JESSIE STAGG; *First Vice-President*, LAWRENCE E. BARRINGER; and *Corresponding Secretary*, MRS. MARY B. CUMMINGS.

Plans were discussed for many interesting activities after the war or somewhat sooner if justified.

The meeting was followed by a dinner, after which there were talks by Kennard Wedgwood of Josiah Wedgwood & Sons, Inc.; Miss Grace Cornell of the Metropolitan Museum of Art; and Rodney Wilcox Jones, president of the Orchid Society of America.

Mr. Jones announced that at the next exhibition held by the New York Society of Ceramic Arts he would offer three cash prizes for the best design using an orchid for the motive. For entries any type of fired and glazed ceramic ware may be used, including decorative pieces, tableware, and tile.

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INDUSTRY COMMITTEE NO. 59 APPOINTED FOR STONE, CLAY, GLASS, AND ALLIED INDUSTRIES*

(1) By virtue of and pursuant to the authority vested in me by the Fair Labor Standards Act of 1938, I, L. Metcalfe Walling, Administrator of the Wage and Hour Division, United States Department of Labor, do hereby appoint and convene for the stone, clay, glass, and allied industries (as such industry is defined in paragraph 2) an Industry Committee composed of the following representatives: *For the Public:* Robert P. Brecht, *Chairman,* Philadelphia, Pa.; Ruth Allen, Austin, Texas; Frederick Dewhurst, New York, N. Y.; Frank T. deVyver, Durham, N. C.; F. B. Gear, Memphis, Tenn.; William S. Hopkins, Palo Alto, Calif.; Colston E. Warne, Amherst, Mass.; and William E. Wickenden, Cleveland, Ohio. *For the Employers:* W. H. Hodges, Atlanta, Ga.; George Dougherty, Pittsburgh, Pa.; Vincent P. Ahearn, Washington, D. C.; J. Frazier Glenn, Asheville, N. C.; W. M. Palmer, Ocala, Fla.; E. Ray Rankin, Statesville, N. C.; J. A. Riggs, Fort Spring, W. Va.; and Fred Smith, Spruce Pine, N. C. *For the Employees:* Leland Beard, Columbus, Ohio; H. C. Ledyard, Fort Wayne, Ind.; Ralph Reiser, Festus, Mo.; Harry H. Cook, Toledo, Ohio; John Garvey, Washington, D. C.; Frank Kasten, Chicago, Ill.; William Schoenberg, Chicago, Ill.; and Boris Shishkin, Washington, D. C.

Such representatives have been chosen with due regard to the geographical regions in which such industry is carried on.

(2) For the purpose of this order, the term "stone, clay, glass, and allied industries" means "the mining, quarrying, or other extraction and the further processing of all minerals other than metal ores and the manufacture of products from such minerals."

(*a*) It includes, without limitation, glass and glass products; structural clay products; china, pottery, ceramic whiteware, and electrical porcelain products; refractories; dimension and cut stone; crushed stone, sand, and gravel; abrasives; cement; concrete, gypsum, and plaster products; and talc, soapstone, feldspar, mica, and asbestos products.

(*b*) Provided, however, that the definition shall not include (1) the extraction of coal, petroleum, or natural gases or the manufacture of products therefrom; or (2) the manufacture of basic chemicals or chemical products; or (3) any product included in the metal, plastics, machinery, instrument, and allied industries (as defined in Administrative Order No. 173) or in the jewelry manufacturing industry as defined in the wage order for such industry.

(3) The definition of the stone, clay, glass, and allied industries covers all occupations in the industry which are necessary to the production of the articles specified in the definition including clerical, maintenance, shipping, and selling occupations; provided, however, that this definition does not cover clerical, maintenance, shipping, and selling occupations when carried on in a wholesaling or selling department, physically segregated from the other departments of a manufacturing establishment, the greater part of the sales of which wholesaling or selling department are sales of articles which have been purchased for resale; and provided further that where an employee covered by this definition is employed during the same workweek at two or more different minimum rates of pay, he shall be paid the highest of such rates for such workweek unless records concerning his employment are kept by his employer in accordance with regulations of the Wage and Hour Division.

(4) Any person, who, in the opinion of the Committee, having a substantial interest in the proceeding and who is prepared to present material pertinent to the question under consideration, may, with the approval of the Committee, appear on his own behalf or on behalf of any other person. Moreover, any interested person may submit in writing pertinent data to the Committee either through the Administrator or through the Chairman of the Committee.

(5) The Industry Committee herein created shall meet at 10:00 A.M. on May 27, 1943, at 165 West 46th Street, New York, N. Y., and, in accordance with the provisions of the Fair Labor Standards Act of 1938 and rules and regulations promulgated thereunder, shall proceed to investigate conditions in the industry and recommend to the Administrator minimum wage rates for all employees thereof who within the meaning of said Act are "engaged in commerce or in the production of goods for commerce," excepting employees exempted by virtue of the provisions of Section 13 (*a*) and employees coming under the provisions of Section 14.

Signed at New York, N. Y., this 30th day of April, 1943.

—L. METCALFE WALLING, *Administrator,*
Wage and Hour Division,
United States Department of Labor

* Administrative Order No. 192, United States Department of Labor. Reprinted from *Federal Register,* May 6, 1943.

PROTESTS AGAINST MOBILIZING SCIENTIFIC AND TECHNICAL RESOURCES

West Virginia Society of Professional Engineers (Northern Panhandle Chapter)

WHEREAS, There has been introduced into the 78th Congress, First Session, by Senator Kilgore, a bill known as Senate Bill S.702, with a companion bill, by Representative Patman, known as House Resolution 2100, to mobilize the scientific and technical resources of the Nation, and for other purposes, and

WHEREAS, The purpose of the act, while seemingly commendable in expression, would regulate the activities of industry and the practice by engineers and scientific personnel of their profession, by an appointed administrator, and

WHEREAS, The expenditure by an administrator of two hundred million dollars or more, authorized by the provisions of this bill, instead of aiding the war effort would only be a waste of public funds, and an expansion of bureaucratic control, and

WHEREAS, The Northern Panhandle Chapter of the West Virginia Society of Professional Engineers, recognizing the fact that these United States of America are leading all other countries of the world in technical and scientific education, research, experimentation, development, and production; and being firmly of the belief that the doctrine of freedom in individual enterprise must be retained and guarded by all American citizens, and being of the opinion that this bill will set up another bureau, not to protect, but to harass, all industry as well as the technical, scientific, and engineering professions in the pursuit of its activities and the practice of their professions, and now therefore be it

Resolved, That the Northern Panhandle Chapter of the West Virginia Society of Professional Engineers vigorously opposes the enactment of this legislation, and be it

Further Resolved, That the Committee on Military Affairs of the Senate and the Committee on Patents of the House of Representatives be and they are hereby respectfully requested to recommend that this bill be not passed, and be it

Further Resolved, That copies of this Resolution be sent to all Senators and Members of Congress from West Virginia; to the Committee on Military Affairs of the Senate and to the Committee on Patents of the House of Representatives; to the Secretary of the West Virginia Society of Professional Engineers, to the Secretaries of the Founders Societies, to all chapters of the West Virginia Society of Professional Engineers; to the Secretary of the National Society of Professional Engineers; to all others interested and to the press.

I, Allen Simmons, do hereby certify that the foregoing Resolution was adopted at a Regular Meeting of the Northern Panhandle Chapter of the West Virginia Society of Professional Engineers, held in Wheeling, West Virginia, April 30, 1943.

—ALLEN SIMMONS, *Secretary*

Electrochemical Society

The following resolution was adopted unanimously by the Electrochemical Society at its eighty-third meeting in Pittsburgh, Pa., April 8–10, 1943:

WHEREAS, It appears that enactment of the Kilgore-Patman Bill (S.702, H.R.2100) for the establishment of an Office of Scientific and Technical Mobilization (*a*) would confuse the war effort by creating at this time a new agency for the direction of the scientific and engineering program which is now so effective in the prosecution of the war and (*b*) might develop in peacetime a gigantic bureaucracy which would impede scientific and technical progress, be it therefore

Resolved, That members of the Electrochemical Society be urged to examine this bill and communicate their views on it to their congressmen, and be it

Further resolved, That the Electrochemical Society in convention assembled express its general opposition to the enactment of any measure which embodies government supervision, regimentation, and control of the scientific and technical resources of the Nation in peacetime.

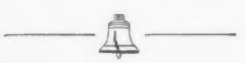
TECHNOLOGY MOBILIZATION VERSUS FREE ENTERPRISE

There Should Be No Regimentation in Technology for War and Postwar.

Technology Should Not Be Divested of Profit Motive.

Industrial Betterment Would Be Hampered by Compulsory Licensed Access to Private Inventions, Processes, and Facilities.

For Freedom from Tyrants a Global War Is Being Fought
For Freedom from Bureaucracy a Political War May Be Fought



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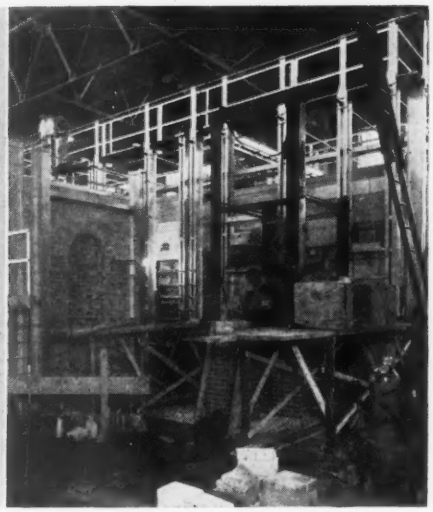

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ENGINEERS

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Abrasives
Carborundum Co. (*Carborundum and Aloxite*)
Electro Refractories & Alloys Corp.
Felker Mfg. Co.
The Hommel, O., Co., Inc.
Norton Co. (*Alundum-Crystolon*)

Abrasive Wheels: (Diamond impregnated for cutting off brittle materials)
Felker Mfg. Co.

Air Conditioning Systems
Frazier-Simplex, Inc.

Aloxite (Refractory Products)
Carborundum Co.

Alumina (Hydrate and Calcined)
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pennsylvania Salt Mfg. Co.
The Vitro Mfg. Co.

Alumina (Fused) Brick and Tile
Electro Refractories & Alloys Corp.
The Vitro Mfg. Co.

Aluminum Oxide (Calcine)
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Aluminum Oxide (Fused)
Carborundum Co.
Electro Refractories & Alloys Corp.
Foote Mineral Co.
Harshaw Chemical Co.
Norton Co.
The Vitro Mfg. Co.

Alundum (Refractory Products)
Norton Co.

Ammonium Bicarbonate
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Solvay Sales Corp.

Ammonium Bifluoride
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Ammonium Carbonate
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Antimony Oxide
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Antimony Sulphide
Foote Mineral Co.
The Hommel, O., Co., Inc.

Arches (Interlocking, Suspending, and Circular)
Frazier-Simplex, Inc.

Arsenic
Drakenfeld, B. F., & Co.
Harshaw Chemical Co.
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Automatic Brick Car Loaders
Lancaster Iron Works, Inc.

Ball Mills
The Hommel, O., Co., Inc.
McDanel Refractory Porcelain Co.
The Vitro Mfg. Co.

Ball Mills (Laboratory Type)
Drakenfeld, B. F., & Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Barium Carbonate
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Foote Mineral Co.
Hammill & Gillespie, Inc.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Basic Oxides
Porcelain Enamel and Mfg. Co.

Batch Systems
Frazier-Simplex, Inc.
Lancaster Iron Works, Inc.
National Engineering Co.

Batts
Carborundum Co. (*"Carbofrax Aloxite"*)
Electro Refractories & Alloys Corp.
Norton Co. (*Alundum-Crystolon*)

Bentonite
Hammill & Gillespie, Inc.

Beryl
Foote Mineral Co.

Bichromate of Soda
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Bitstone
Potters Supply Co.

Blades: (Diamond impregnated for cutting glass, tile, quartz, ceramics, Vitreous Products)
Felker Mfg. Co.

Blocks (Refractory)
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Corhart Refractories Co.
Electro Refractories & Alloys Corp.
Norton Co.
The Vitro Mfg. Co.

Body Stains
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
The Hommel, O., Co., Inc.

Bone Ash
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Borax
American Potash & Chemical Corp.
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I , & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pacific Coast Borax Co.
Stauffer Chemical Co.
The Vitro Mfg. Co.

Borax Glass
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co , Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pacific Coast Borax Co.
Stauffer Chemical Co.
The Vitro Mfg. Co.

Boric Acid (Anhydrous)
Drakenfeld, B. F., & Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pacific Coast Borax Co.
Stauffer Chemical Co.
The Vitro Mfg. Co.

Boric Acid (Crystal, Granular, or Powder)
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Drakenfeld, B. F., & Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pacific Coast Borax Co.
Stauffer Chemical Co.
The Vitro Mfg. Co.

Boron Carbide
Norton Co.

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Lancaster Iron Works, Inc.

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Carborundum Co. (*"Carbofrax Aloxite"*)
Corhart Refractories Co.
Electro Refractories & Alloys Corp.
Norton Co.
The Vitro Mfg. Co.

Cadmium Sulphide
Drakenfeld, B. F., & Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Carbofrax (Refractory Products)
Carborundum Co.

Carbonates (Barium, Lead)
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Foote Mineral Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Castings
Lancaster Iron Works, Inc.

Caustic Potash
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Solvay Sales Corp.

Caustic Soda
Du Pont de Nemours, E .I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pennsylvania Salt Mfg. Co.
Solvay Sales Corp.
Stauffer Chemical Co.
The Vitro Mfg. Co.

Cements
Carborundum Co.
Corhart Refractories Co.
Electro Refractories & Alloys Corp.
Norton Co.
Pennsylvania Salt Mfg. Co.

Ceramic Chemicals
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Metal & Thermit Corp.
Pennsylvania Salt Mfg. Co.
Porcelain Enamel and Mfg. Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

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Foote Mineral Co.

Chromite (Natural Chromate of Iron)
Foote Mineral Co.

Chromium Oxide
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Du Pont de Nemours, E. I., & Co., Inc. Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Porcelain Enamel and Mfg. Co.
The Vitro Mfg. Co.

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Hammill & Gillespie, Inc.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
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Maxson, Elwyn L.
Potters Supply Co.
Spinks, H. C., Clay Co.
The Vitro Mfg. Co.

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Foote Mineral Co.
Great Lakes Foundry Sand Co.

Clay (Block)
Du Pont de Nemours, E. I., & Co.. Inc Electrochemicals Dept.

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Harshaw Chemical Co.
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Maxson, Elwyn L.
The Vitro Mfg. Co.

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Spinks, H. C., Clay Co.

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Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Kentucky Clay Mining Co.
Maxson, Elwyn L.
Metal & Thermit Corp.
Porcelain Enamel and Mfg. Co.
Spinks, H. C., Clay Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Clay (Fire)
Great Lakes Foundry Sand Co.
Maxson, Elwyn L.
Potters Supply Co.

Clay (German Vallendar)
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemical Dept.
Hammill & Gillespie, Inc.
Harshaw Chemical Co.
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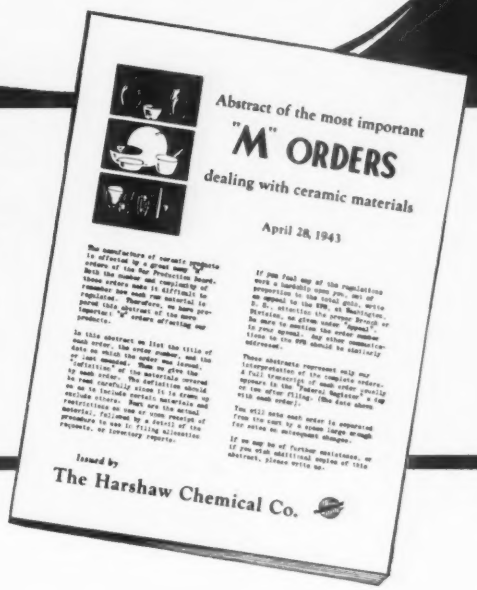

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Spinks, H. C., Clay Co.

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Clay (Wad)
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Potters Supply Co.
Spinks, H. C., Clay Co.

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Spinks, H. C., Clay Co.

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The Vitro Mfg. Co.

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The Hommel, O., Co., Inc.
Porcelain Enamel and Mfg. Co.
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Porcelain Enamel and Mfg. Co.

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The Hommel, O., Co., Inc.

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Harshaw Chemical Co.
The Hommel, O., Co., Inc.

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Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

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Foote Mineral Co.

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Lancaster Iron Works, Inc.
National Engineering Co.

Muriatic Acid
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pennsylvania Salt Mfg. Co.

Needle Antimony
Foote Mineral Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Nepheline Syenite
Great Lakes Foundry Sand Co.

Nickel Salts
Drakenfeld, B. F., & Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Nitrates (Cobalt, Sodium)
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc. Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Nitre
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Norbide (Norton Boron Carbide)
Norton Co.

Olivine
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.

Opacifiers
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Metal & Thermit Corp.
Pennsylvania Salt Mfg. Co.
Porcelain Enamel and Mfg. Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Overglaze Colors
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.

Oxides
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Metal & Thermit Corp.
Porcelain Enamel and Mfg. Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Palladium Decorations
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
The Hommel, O., Co., Inc.

Pans—Wet and Dry
Clearfield Machine Co.

Pins
The Hommel, O., Co., Inc.
Industrial Ceramic Products, Inc.
Potters Supply Co.

Placing Sand
Great Lakes Foundry Sand Co.

Platinum Decorations
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
The Hommel, O., Co., Inc.

Polariscopes
Bausch & Lomb Optical Co.
Frazier-Simplex, Inc.

Porcelain Enameling Service (Practical)
American Rolling Mill Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
The Hommel, O., Co., Inc.
Porcelain Enamel and Mfg. Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Porcelain Enamels
The Hommel, O., Co., Inc.
Porcelain Enamel and Mfg. Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Potash (Carbonate)
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Solvay Sales Corp.
The Vitro Mfg. Co.

Producer Glass Plants
Frazier-Simplex, Inc.

Pug Mills
Lancaster Iron Works, Inc.

Pyrites (Natural Iron Sulphide)
Foote Mineral Co.
The Hommel, O., Co., Inc.

Pyrometer Tubes
Carborundum Co.
Leeds & Northrup Co.

Pyrometer Tubes (Refractory and Hard Porcelain)
Electro Refractories & Alloys Corp.
McDanel Refractory Porcelain Co.
Norton Co.

Pyrometers (Optical, Radiation, Surface, Immersion, Needle)
Leeds & Northrup Co.

Pyrometric Cones
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Lancaster Iron Works, Inc.

Recorders, CO_2
Leeds & Northrup Co.

Recorders, Draft
Leeds & Northrup Co.

Recorders, Tank Pressure
Leeds & Northrup Co.

Refractometers
Bausch & Lomb Optical Co.
Electro Refractories & Alloys Corp.

Refractories
Carborundum Co.
Corhart Refractories Co.
Electro Refractories & Alloys Corp.
Norton Co.

Refractory Materials
Carborundum Co.
Corhart Refractories Co.
Electro Refractories & Alloys Corp.
Norton Co.
Titanium Alloy & Mfg. Co.

Respirators
Drakenfeld, B. F., & Co.
The Hommel, O., Co., Inc.

Rutile
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Foote Mineral Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Metal & Thermit Corp.
The Vitro Mfg. Co.

Saggers
Carborundum Co.
Electro Refractories & Alloys Corp.
Norton Co.
Potters Supply Co.

Salt Cake
American Potash & Chemical Corp.
Drakenfeld, B. F., & Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pennsylvania Salt Mfg. Co.

Sandblast Sand
Great Lakes Foundry Sand Co.

Sand Grinders and Sifters
Lancaster Iron Works, Inc.

Saponin
The Hommel, O., Co., Inc.

Saws: Diamond impregnated for cutting off
Felker Mfg. Co.

Screening and Magnetic Separators
National Engineering Co.

Selenite of Sodium
Drakenfeld, B. F., & Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Selenium
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Foote Mineral Co.
Harshaw Chemical Co.
The Hommel O., Co., Inc.
The Vitro Mfg. Co.

Sheets (Enameling Iron)
American Rolling Mill Co.

Silica (Fused)
Electro Refractories & Alloys Corp.
Foote Mineral Co.
The Hommel, O., Co., Inc.

Silicate of Soda
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Silicon Carbide
Carborundum Co.
Electro Refractories & Alloys Corp.
Norton Co.

Silicon Carbide Firesand
Carborundum Co.

Sillimanite Refractories
Electro Refractories & Alloys Corp.

Slabs (Furnace)
Carborundum Co.
Electro Refractories & Alloys Corp.
Norton Co.

Soda Ash
American Potash & Chemical Corp.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pennsylvania Salt Mfg. Co.
Solvay Sales Corp.
The Vitro Mfg. Co.

Sodium Antimonate
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Metal & Thermit Corp.
The Vitro Mfg. Co.

Sodium Fluoride
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Sodium Metasilicate
Harshaw Chemical Co.

Sodium Nitrite
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Sodium Silica Fluoride
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Sodium Uranate
Drakenfeld, B. F., & Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Soot Blowers
Frazier-Simplex, Inc.

Special Machines
Frazier-Simplex, Inc.

Spar
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Maxson, Elwyn L.
The Vitro Mfg. Co.

Spray Booths
The Hommel, O., Co., Inc.

Spraying Equipment
The Hommel, O., Co., Inc.

Spurs
Potters Supply Co.

Stacks
Lancaster Iron Works, Inc.

Steel Plate Construction
Lancaster Iron Works, Inc.

Stilts
The Hommel, O., Co., Inc.
Industrial Ceramic Products, Inc.
Potters Supply Co.

Sulfur
Stauffer Chemical Co.

Sulfuric Acid
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pennsylvania Salt Mfg. Co.
Stauffer Chemical Co.

Talc
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Hammill & Gillespie, Inc.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
International Pulp Company

Tanks
Frazier-Simplex, Inc.

Tank Blocks
Cohart Refractories Co.

Tanks (Pickle)
The Hommel, O., Co., Inc.

Tanks for Raw Material Steel or Concrete
Lancaster Iron Works, Inc.

Tile (Floor)
Norton Co.

Tile (Muffle)
Carborundum Co.
Electro Refractories & Alloys Corp.
Norton Co.

Tile (Refractory)
Carborundum Co., (*Carbofrax*)
Electro Refractories & Alloys Corp
Norton Co.

Tin Oxide
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
The Hommel, O., Co., Inc.
Metal & Thermit Corp.
The Vitro Mfg. Co.

Titanium
Drakenfeld, B. F. & Co.
Foote Mineral Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Titanium Oxide
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc. Electrochemicals Dept.
Foote Mineral Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Metal & Thermit Corp.
Titanium Alloy Mfg. Co.
The Vitro Mfg. Co.

Trisodium Phosphate
Harshaw Chemical Co.

Trucks
Lancaster Iron Works, Inc.

Tubes (Insulating)
Carborundum Co.
McDanel Refractory Porcelain Co.
Norton Co.

Tubes (Pyrometer)
Carborundum Co.
Electro Refractories & Alloys Corp.
Leeds & Northrup Co.
McDanel Refractory Porcelain Co.
Norton Co.

Uranium Oxide
Drakenfeld, B. F., & Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Uranium Oxide (Yellow-Orange-Black)
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Water Softening Plants
Frazier-Simplex, Inc.

Wet Enamel
The Hommel, O., Co., Inc.
Porcelain Enamel and Mfg. Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Whiting
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Hammill & Gillespie, Inc.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Winding Drums
Lancaster Iron Works, Inc.

Zinc Oxide
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Zircon
Foote Mineral Co.
The Hommel, O., Co., Inc.

Zirconia
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Foote Mineral Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Metal & Thermit Corp.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Zirconium Oxide
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Titanium Alloy Mfg. Co.

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